OCT 21 1947
MEDICAL LIBRARY

Official Journal of the
INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION

Postgraduate Medicine

VOLUME 2, Number 4 OCTOBER 1947

Special articles in this issue

DIAGNOSIS AND TREATMENT OF EPILEPSY
Donald S. McEachern, M.D., ASSOCIATE PROFESSOR OF NEUROLOGY, McGILL UNIVERSITY FACULTY OF MEDICINE, MONTREAL

DISABILITIES RESULTING FROM COMPRESSION FRACTURES OF THE SPINE
Arthur Steindler, M.D., HEAD OF THE DEPARTMENT OF ORTHOPEDIC SURGERY, STATE UNIVERSITY OF IOWA SCHOOL OF MEDICINE, IOWA CITY

DIAGNOSIS AND TREATMENT OF PEPTIC ULCER
Donald C. Balfour, M.D., PROFESSOR OF SURGERY, GRADUATE SCHOOL, MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH OF THE UNIVERSITY OF MINNESOTA, ROCHESTER

Complete Table of Contents on Page 5

DIAGNOSIS AND TREATMENT OF SCHIZOPHRENIA
Karl A. Menninger, MANAGER, WINTER VETERANS ADMINISTRATION HOSPITAL; DIRECTOR OF EDUCATION, THE MENNINGER FOUNDATION, TOPEKA, KANSAS

Case Report

CASE OF SITUS INVERSUS TOTALIS
Maurice A. Michael, M.D., ACTING CHIEF OF SURGICAL SERVICE, VETERANS ADMINISTRATION HOSPITAL, LEBANON, PENNSYLVANIA

Scientific Exhibit

ACUTE PANCREATITIS: MEDICAL AND SURGICAL MANAGEMENT
Thomas A. Shallow, M. D., Sherman A. Eger, M. D., and Frederick B. Wagner, Jr., M. D.

Whole proteins are not only more palatable and more smoothly assimilated than protein hydrolysates, they are biologically more efficient.*
'DELCOS' Protein-Carbohydrate Granules provide highest quality whole proteins, *casein* and *lactalbumin*, protected by carbohydrate, 30%, and palatable, even in large, prolonged dosage.
Protein replacement usually requires 100-200 Gm. daily, for several weeks. The best route is by mouth, for any patient who can swallow. Infusion hazards are avoided; more complete nutrition is provided.*
'DELCOS' Granules are exceptionally palatable, mix easily with food, are not affected by cooking, and are 20% more effective biologically than beefsteak.
When oral protein is indicated, supplement a high nitrogen diet with 'DELCOS' Granules, the protein patients accept, dose after dose, day after day.
*J.A.M.A. 131:826, 1946

whole protein

100% | palatable
digestible
efficient

SHARP & DOHME

'delcos'

protein-carbohydrate granules

Supplied in 1-lb. and 5-lb. wide-mouthed jars.

Sharp & Dohme, Philadelphia 1, Pa.

The Diagnosis and Treatment of Epilepsy

DONALD S. McEACHERN*

MONTREAL NEUROLOGICAL INSTITUTE, MCGILL UNIVERSITY

THERE are probably 600,000 people in the United States and Canada who suffer from epilepsy. It is as common as tuberculosis or diabetes. It may be even more disabling since the people and their relatives live in fear of fleeting seizures which may occupy but a few minutes out of years of promising life. It has been estimated that the direct annual cost of epilepsy must exceed $100,000,000, but no one can estimate the cost in terms of grief and despair.

Epilepsy is a symptom and is due to periodic and explosive discharge of nerve cells in the brain. Each one of us is a possible candidate for an epileptic seizure under certain circumstances. Temporary arrest of blood supply to the brain, hypoglycemia, an electric shock, or other factors may induce a seizure in any normal person. In a sense the epileptic seizure is the brain's normal response to certain abnormal circumstances. The trouble is that in many cases we do not know what these circumstances are. In the end such neuronal explosions must be due either to metabolic or physicchemical changes in nerve cells which render them unstable and permit them to fire off either spontaneously or when disturbed by a scar, a tumor, or other abnormality of the brain.

Why seizures due to hypoglycemia, brain tumor, or other demonstrable cause should be considered more reputable than those of unknown origin is hard to understand. But this feeling persists, and perhaps it can be laid to our own muddled ideas about heredity, mental deterioration, and personality changes in epilepsy. We are still left with the wastebasket term "idiopathic" epilepsy, into which we throw cases of unknown causation. Our main clinical problems are (1) to recognize and treat those cases in which seizures are due to disease of the brain, or to abnormalities of the circulation or of the chemical processes of the body, and (2) to treat symptomatically the cases which, in our ignorance, we label "idiopathic" epilepsy.

INVESTIGATION OF A CASE OF EPILEPSY

Many of the steps taken to discover organic causes of seizures are well known. I shall review them briefly, emphasizing certain new and valuable methods. The search must be patient and systematic to be successful.

*Associate Professor of Neurology, McGill University Faculty of Medicine; chief of Neurological Service, Montreal Neurological Institute and Neurologist-in-chief, Royal Victoria Hospital, Montreal.

Clinical investigation—The age of onset and type of seizure are of fundamental importance. Omitting the convulsions which occur so frequently in childhood, and which are associated with any fever, we may say generally that epilepsy starting within the first two decades usually is to be placed in that vague group called idiopathic. Starting within the next two decades it is usually associated with brain tumor. Thereafter renal and cerebral vascular causes become increasingly frequent, but the possibility of brain tumor should always be kept in mind. A history of prolonged or difficult birth and retarded development may indicate cerebral birth trauma. Head injury, even if remote, should suggest the possibility of a meningocerebral scar as a cause of seizures.

Every physician, nurse, and relative should be taught to describe accurately the patient's aura and the pattern of attacks. The common patterns of focal attacks are illustrated in Figure 1. A complete record giving the number and dates of seizures must be kept by the patient, since this is the only true guide to the success of therapy. It is essential to observe the very beginning of an attack since it may spread rapidly from a focal to a generalized convulsion without a localizing pattern. Rapid examination immediately after an attack may reveal temporary changes in the reflexes or sensibility which point to a focal defect and which cannot be elicited in the interim.

It is occasionally necessary to induce an attack in order that the pattern can be observed. This can sometimes be accomplished by having the patient hyperventilate strongly until an attack occurs or until carpopedal spasm appears. Hydration of the patient is even more effective. Water is given in large quantities along with repeated injections of pitressin. This is, however, a hospital procedure.

Appropriate chemical studies are based on the circumstances under which attacks occur. Spontaneous hypoglycemia may be suspected if attacks occur during fasting and are preceded by vagueness, anxiety, and sweating. There may be a curious, dreamy state with purposeless behavior both before and for a long time after the seizure. Attempts should be made to produce attacks by fasting, to relieve them by administration of glucose, and to obtain chemical proof by blood sugar determinations made during attacks. Glucose tolerance curves should be carried at least to five hours in order to determine the low point which follows the early rise of blood sugar. A word of caution—sugar curves are tricky things to interpret.

DONALD S. McEACHERN

I recall two elderly patients in whom epileptic seizures occurred only during the development of recurrent latent tetany. One suffered from osteomalacia and the other from mild parathyroid deficiency resulting from a thyroid operation. Attacks associated with uremia, cerebral syphilis, vascular hypertension, and cerebral arteriosclerosis are usually recognized by careful routine examination. Even in these instances, however, special studies may be necessary, since there is no guarantee that cerebral tumor and arteriosclerosis or syphilis do not coexist. We have seen the conjunction on several occasions.

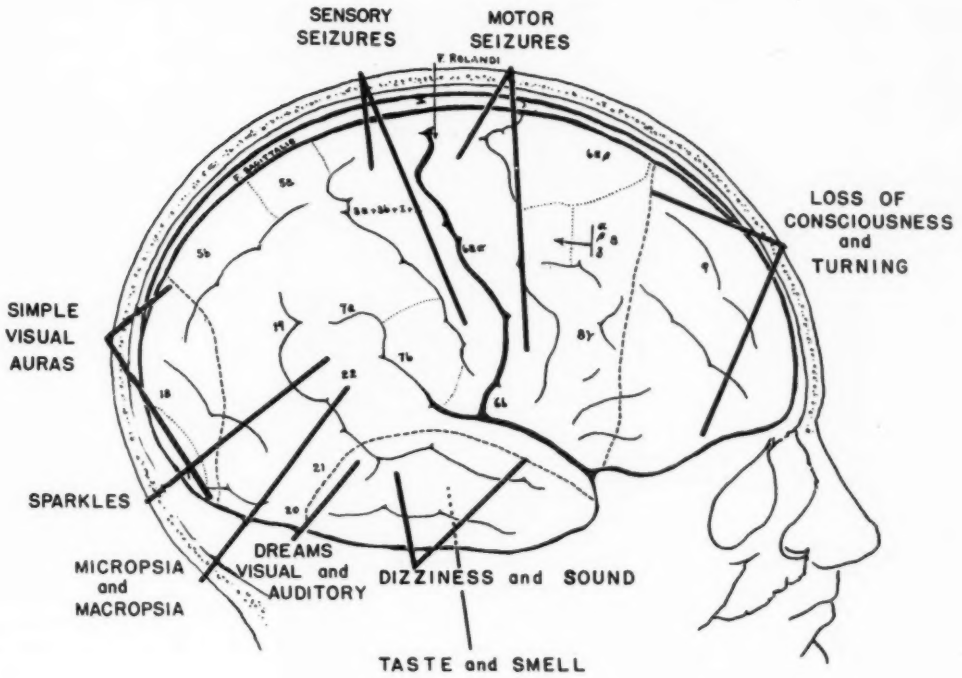


Figure 1. Chart of common initial phenomena of seizures arising in different parts of the brain. The leading lines indicate general and not punctate localization.

Mention should be made of seizure with hypersensitivity of the carotid sinus reflex mechanism. As a result of sudden turning of the neck, an unusual position of the head, or pressure from a high stiff collar, such patients suffer from a reflex fall of blood pressure or cardiac arrest, or both. Syncope results, and if the cerebral circulation is interrupted for more than about twelve seconds, a convulsion may ensue. One of my patients, a middle-aged man, complained of seizures since childhood. Attacks first came when he knelt to pray in church on Sunday. This was the only day of the week when he was dressed in an Eton suit with a high, stiff collar. Attacks ceased when the minister advised that he stay away from church since the prayers obviously did him no good. Attacks recurred later when he sat in the barber's chair and his head was thrust forward while the nape of the neck was clipped. It was easy to reproduce the attacks by pressure over either carotid sinus.

Carotid sinus syncope should be suspected in any elderly patient who complains of brief spells of fainting, dizziness, or "black-out." It can be tested by massaging one carotid sinus at a time with the thumb placed behind the angle of the jaw. The patient should be in an upright position.

Explanation of the mechanism may suffice to keep these people out of trouble. Atropine or ephedrine is occasionally helpful. If necessary, the sinus can be denervated surgically. Attacks of similar character occur with Stokes-Adams syndrome in heart block.

Figure 2. Pneumoencephalogram of patient with cyst of right temporal lobe and generalized seizures.

Roentgenography — Good stereoscopic x-ray films of the skull should never be omitted. They may show quite unsuspected bony changes or asymmetry of the skull. There may be calcium deposits indicative of tumor, shift of the shadow of the pineal gland due to an atrophic or expanding lesion in one hemisphere, or even evidence of increased intracranial pressure.

Pneumography—X-ray visualization of the ventricles following injection of air or oxygen into the subarachnoid space has proved an invaluable procedure. When there is no contraindication, encephalography is done, the gas being injected by the lumbar route after removal of spinal fluid. A case in point is that of an 8-year-old girl, who was presumed to have been suffering from idiopathic epilepsy for four years. X-rays of the skull showed marked disproportion between the two sides of the cranial cavity; the encephalogram (Figure 2) revealed lack of filling of the right temporal horn and displacement of the ventricles to the left. At operation a large cystic collection of cerebrospinal fluid was found in the right temporal lobe due to a thin membrane which separated the temporal horn from the rest of the ventricular system. This thin veil of tissue, presumably a congenital defect, spelled the difference between normal health and epilepsy.

A more recent case is that of a man of 46, whose only complaints were two generalized convulsions commencing several months previously. Clinical examination was negative. The encephalogram (Figure 3) showed the right lateral ventricle to be depressed downward and displaced to the left. This was due to a large meningeal tumor, which was removed.

Meningocerebral scars, subdural hematomas, and areas of focal atrophy may also be recognized by this method and dealt with surgically.

Figure 3. Pneumoencephalogram with generalized seizures due to benign meningeal tumor in right parietal region.

Cerebral arteriography—The visualization of the cerebral arteries following injection of a radiopaque substance, such as thorotrast, into the carotid artery in the neck is of limited usefulness. When an aneurysm or vascular tumor is present, however, it may be the best or the only way to visualize the lesion.

Electroencephalography—Although a newcomer in the field, this method has already become well established. During its few years of rapid growth, this ingenious method of recording the so-called "brain waves" has become a reliable clinical tool.

The principle is that the rhythmic changes of potential of the normal brain can be led off from the surface of the intact scalp, stepped up about one million times by radio amplifiers, and recorded by means of ink writers on a moving strip of paper. Small silver electrodes are fixed to the scalp with collodion in a number of standard locations on each side of the head. (See Figure 4). These are led off to a switching box which permits simultaneous records to be made from a number of locations. The electrical activity of one side of the brain may be compared with that of the other side, or one small area with another.

Normally, two main rhythms can be recorded from the adult brain. Alpha (Berger) waves appear from the occipital regions at a frequency of about 10 per second, and beta waves at about 22 per second from the frontal regions. In epilepsy the normal rhythms are greatly disrupted, not only during a seizure but (also nearly always) during intervals when the patient seems entirely well. (Figure 5).

THE following are some applications of this method to our knowledge of epilepsy.

The *diagnosis* of an epileptic attack is easy

Figure 4. Method of applying scalp electrodes for electroencephalography.

when a seizure is observed or has been accurately described. When, however, there is but a vague history of fainting spells, of waking in the morning with a bitten tongue, or of momentary absences, the diagnosis of epilepsy is a precarious one. The electroencephalogram may assist by showing either typical epileptic abnormality or a normal rhythm. Further, temper outbursts and fleeting personality changes in an epileptic patient can sometimes be correlated with a surge of subclinical electrical abnormality in the brain, though there may be no outward sign of a convulsive seizure. Indeed, many problem children have been found to have such electrical abnormalities even though they had never suffered convulsive seizures.

The electroencephalogram also gives some indication of the type of epileptic activity. It is possible that with further experience we will classify seizures according to the underlying electrical abnormality, just as the terminology of the cardiac arrhythmias was altered by MacKenzie's study of pulse tracing nd Lewis' analysis of the electrocardiogram.

Occasionally, differentiation between hysteric and epileptic seizures may be aided. Records taken during an hysteric seizure show a normal cerebral rhythm. Epileptics always show seizure waves during an attack.

Localization of epileptic foci is another important function of electroencephalography and may lead to successful surgical removal of the focus.

Finally, the method may be of value in the *control of medicinal therapy*. If a patient has a seizure only once in several months, it may take painfully long to determine whether his medication is adequate. His electroencephalogram may, however, show almost continual

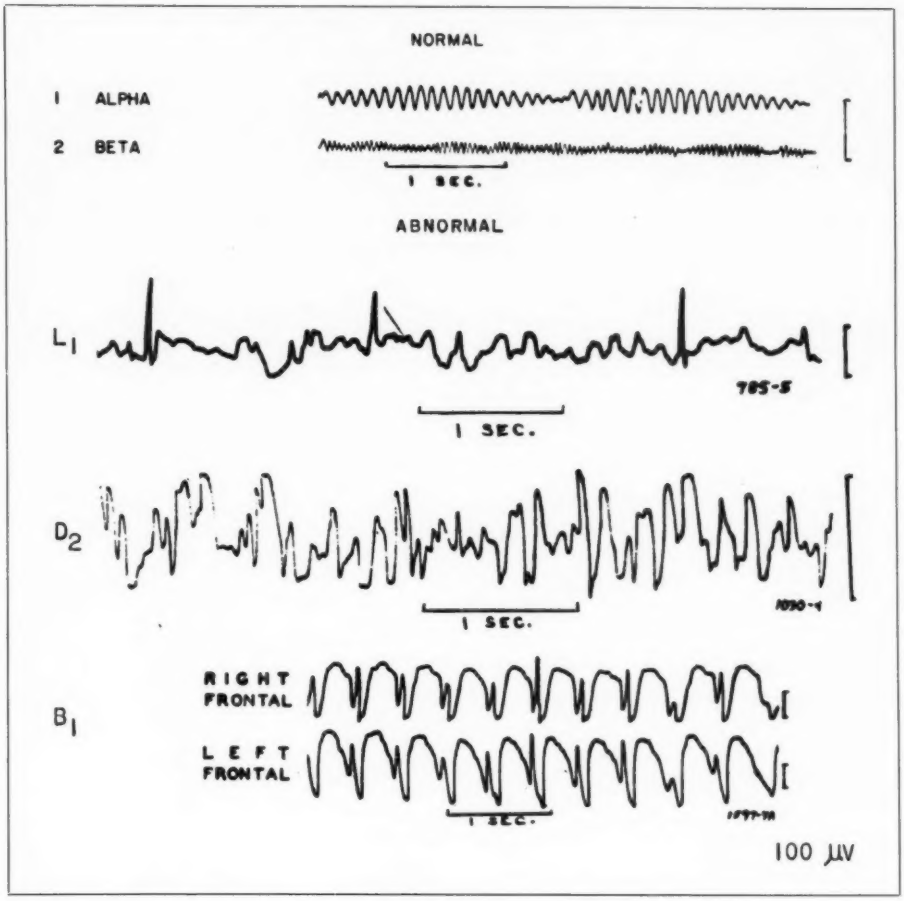


Figure 5. Samples of normal and abnormal encephalograms. L_1—Local random spikes from patient with focal epilepsy due to meningo-cerebral scar. D_2—Diffuse multiple sharp waves from patient with idiopathic epilepsy. B_1—Bilaterally synchronous spike and slow waves from patient during petit mal attack.

epileptic activity which is reduced or disappears within a few days with adequate therapy. Unfortunately, there is no rule to this, and some patients may remain free of attacks with little or no improvement in the electroencephalogram.

Let us guard against the exploitation of this valuable method. The technic is difficult to master, and interpretation of the records requires experience and good judgment. Remember the early days of electrocardiography, when machines were multiplying by the hundred and self-styled heart specialists sprang up overnight. It will not be long before fairly simple apparatus is available for recording the E.E.G. Let us use it with caution and common sense and not as "gadgeteers."

We have reviewed the steps sometimes neces-

sary to uncover the causes of epileptic seizures; there remain, however, many cases for which no cause can be found. It is worth while, then, to discuss the medicinal treatment of such cases.

TREATMENT

Drug therapy—We will consider here only drugs of proved usefulness—the bromides, phenobarbital, dilantin, mebaral, and the new drug, Tridione. They are powerful tools and it is worth remembering certain principles governing their use. First, some patients are not helped by medicines. If seizures are not reduced or the patient is not benefited, it is wasteful and may be harmful to continue with the drug. Second, there is no standard dose that suits all patients. The dose should be increased until seizures are controlled unless toxic symptoms prevent this. Third, not all types of seizures are helped equally by a given medicine. It is criminal to permit a patient to go on for months or years with uncontrolled seizures and try no change of medication. Fourth, our aim is not only to stop seizures, but to improve the total condition of the patient. A regimen which stops seizures but turns the patient into a vegetable has little to recommend it. With these points in mind, let us now take inventory of our tools.

THE bromides are used much less now than formerly. They are often not as effective as the other drugs. They frequently cause unpleasant acne, depress and slow down the patient's mental activity, and occasionally pile up in the system to cause a real toxic psychosis. The latter picture is not as well known as it should be, though it is not uncommon. The patient develops incoordination, a staggering gait, and thick speech. This may advance to frank delirium with hyperactivity delusions, hallucinations, and even coma. One of our patients who was treating himself with a mail-order epilepsy nostrum was committed to a mental institution before the condition was recognized. The psychosis is related to the concentration of bromide in the blood and tissues, and the well-known bromide skin eruption is usually absent. The condition can go unrecognized for months. The blood bromide is almost invariably above 150 mg. per cent. Treatment consists of replacing the bromides by some other drug, and of giving 12 to 15 gm. of sodium chloride per day. The chloride replaces the bromide ion, and the psychosis clears quite rapidly. Despite these disadvantages there are some cases of epilepsy in which the bromides give better control of seizures than any of the other drugs.

Phenobarbital is probably a more effective drug and certainly causes fewer toxic manifestations. Moderate doses may not cause dullness; large doses, however, may be necessary to control seizures, and then unfortunate slowing of cerebration results. A good tip is that the addition of small doses of benzedrine or of caffeine may abolish the mental dullness without altering the anticonvulsive effect of the phenobarbital. A total of 1.5 to 2 gr. of phenobarbital per day, divided into several doses, may suffice to control seizures, but we have sometimes been forced to raise the dose to 9 gr. daily, before the seizures were controlled or the drug was abandoned. Phenobarbital is also available in soluble form for use in prescriptions. This sodium salt contains 10 per cent less phenobarbital than the phenobarbital itself. Liquid preparations should not be kept for more than three weeks, since absorbed CO_2 tends to precipitate the acid form of the drug.

Phenobarbital soluble is valuable when given intravenously or subcutaneously in doses of 1 to 5 gr. for the control of status epilepticus. In this emergency, however, we prefer to use avertin administered by rectum in two-thirds the usual anesthetic dose.

Dilantin (sodium 5, 5-diphenylhydantoinate), a new drug, has already proved its merit and has practically remade the lives of some epileptic patients. It has high anticonvulsive power; its great advantages are that it has no hypnotic effects and it causes no mental dulling. Occasionally, it has mild stimulating effects. I have seen patients who were apathetic, querulous, and inclined to temper outbursts transformed into pleasant, agreeable, and

brighter people when sedative drugs were replaced by dilantin.

In a large series of cases dilantin has proved more effective in stopping or lessening seizures than either phenobarbital or bromides. It is especially effective in controlling psychomotor seizures, the so-called psychic variants, or states of motor automatism, which are little influenced by the bromides or phenobarbital. Like other drugs, dilantin is much less effective in controlling petit mal attacks. It may indeed aggravate them. In the end, a persistent and conscientious search is necessary to determine which drug is the best for the individual patient. I have one patient whose seizures have been completely abolished by the use of dilantin, whereas a cousin's attacks which became worse with dilantin are well controlled with phenobarbital.

Dilantin is analogous to the barbiturates, but is a derivative of glycolyl urea instead of malonyl urea. It is soluble only in alkaline solution and therefore cannot be given intravenously. The drug is available in capsules containing 1.5 gr. for adults and 0.5 gr. for children. The usual dosage for adults is 1.5 gr. three or four times daily, though we have exceeded that amount on occasion. The drug should be taken during the course of a meal or with milk before retiring to avoid any tendency to gastric distress. The dosage is proportionately less for children, and the powder may be mixed with cream if they are unable to swallow capsules. If adequate doses of dilantin fail to control attacks, the addition of small doses of phenobarbital sometimes meets with success. The most suitable combination is a matter for clinical trial.

CERTAIN mild toxic phenomena are quite common with dilantin. After a few days of full dosage there may appear some degree of nystagmus, diplopia or difficulty in focusing the eyes, and moderate dilatation of the pupils. There may be dizziness, incoordination of the limbs, and staggering gait. These symptoms usually pass off in a few days. If not, it may be necessary to reduce the dose for a week. Resumption of the full dose may then not lead to a return of toxic symptoms. Only rarely is it necessary to discontinue the drug.

Quite exceptionally a patient appears to be sensitive to dilantin and reacts with sharp fever, sore throat, or a skin rash. The latter is a red, macular eruption, involving the trunk and limbs and may be intensely itchy. It may appear within a day or so after treatment has begun, or as long afterwards as three weeks.

A much commoner but not very troublesome complication is a curious hyperplasia of the gums, occasionally accompanied by soreness and some bleeding. With good oral hygiene the condition has not forced us to stop using the drug in any of my cases. A very helpful point is to have the patient massage the gums with the forefinger for five minutes twice daily.

Toxic side effects are less apt to appear if the dosage of the drug is increased gradually over the course of several weeks to the desired maintenance level. If one wishes to change a patient over from phenobarbital to dilantin, the replacement should be made gradually.

A satisfactory method is as follows: If a patient is receiving phenobarbital three times daily, only one of these doses should at first be replaced by a dose of dilantin. After three days further replacement of one dose can be made, and so on every three days until the patient is receiving dilantin alone three or four times daily. This method reduces the danger of releasing seizures through sudden withdrawal of the phenobarbital.

The use of dilantin requires careful supervision by a physician and intelligent manipulation of dosage. It will then be found to work like a miracle for some patients, to benefit quite a number of others, and in a few instances to be useless.

Mebaral (methylethylphenylbarbituric acid) is a drug with which I have not had wide experience. Reports indicate that it may be very satisfactory in some cases which are not controlled by other drugs. It is relatively free of toxic and hypnotic qualities and deserves wider

trial. The usual dosage is 3 gr., two or three times daily.

Tridione seems to have a special place in the treatment of petit mal attacks and other variants that are associated with 3 per second spike and slow waves in the E.E.G. (Figure 5). It is not effective against grand mal seizures but can be used along with one of the other drugs. Tridione has no hypnotic effects but may cause a curious visual phenomenon—a sensitiveness to bright light and loss of visual contrast. Some adults find this enough of a handicap to require withdrawal of the drug. Agranulocytosis due to Tridione has been reported, but with proper care and follow-up of patients we have had no trouble in this regard. The adult dose is one 5 gr. capsule three or more times daily.

Success with any of the above named drugs requires painstaking trial and adjustment of dosage. Too often the physician looks upon the situation with gloomy pessimism, writes a prescription for some drug, and washes his hands of the matter. There can be no excuse for the doctor who permits a patient to go on indefinitely with uncontrolled seizures without complete study of the case or change of regimen. It is important also to individualize treatment. Some patients have their attacks only at night, and should thus receive a larger proportion of their medication before retiring. Some women have attacks only at the time of the menstrual period, and should obviously be given greater protection at that time.

The doctor seldom witnesses a seizure save by accident. His chief concern is to save his patient from injury and embarrassment. The collar should be opened, the limbs kept free of near-by objects, a folded handkerchief placed between the teeth if possible. Don't thrust a stick between the teeth. A bitten tongue will heal but not a broken tooth. During the brief period of purposeless behavior before recovery, go along with the patient and don't restrain him unless necessary. Above all, don't order an ambulance and admit him to hospital until you find out whether he wants you to.

The above discussion has dealt with but a few of the many questions that arise in the care of the epileptic patient. Others include the use of ketogenic diets in children; the question of rest and exercise and proper elimination; the avoidance of dangerous occupations; the problem of marriage, of bolstering the patient's morale, of tempering the family's shame and humiliation, of advising upon inheritance of a condition which may be many different conditions aping one another.

Idiopathic epilepsy should be a hopeful condition. It can be diagnosed early before there is mental deterioration; there is no structural impairment of the brain as in many other diseases. Education and understanding will remove the stigma from it as they have from cancer and tuberculosis.

Above all, we need funds. Funds to carry out large-scale trials of new drugs. Funds to support eager young men whose training fits them to delve into the mechanism of seizures. Funds to provide these men with the equipment they need. For this much is certain—be it a long time or be it short, investigation and research will some day reveal the mechanism that permits such seizures to occur.

Disabilities Resulting from Compression Fractures of the Spine

ARTHUR STEINDLER*

STATE UNIVERSITY OF IOWA SCHOOL OF MEDICINE, IOWA CITY

It is common belief among surgeons that in simple compression and comminution fractures of the spine without cord damage the solution of the problem of disability rests with the reduction and consolidation of the fracture. This opinion has been gaining ground rapidly with the introduction of the hyperextension treatment. It actually goes back to Taylor, who, in 1900, corrected his cases in supine position, hoisting the spine up by means of his "kyphotone," which was placed at the site of the fracture. Having been practiced by Pierre Mallet in France and Boehler in Germany, the method has found its most outstanding advocates in Watson-Jones in England, in Davis and Dunlap in this country, and in Bado in Uruguay, each of whom added their own modifications to the technic. The superiority of this newer hyperextension method need not be emphasized. Indeed, in recent fractures of the dorsolumbar or lumbar region, this method should always make possible the correction of the wedging of simple compression fractures.

O'Donahue, remarking that of all fractures of the spine, including lamina, spinous, and articular processes, etc., only 19 per cent are pure compression fracture without cord damage, found that in 50 cases not treated by hyperextension methods the average true disability was eleven months and that 28 per cent of the cases were found to have persistence of symptoms with permanent disabilities extending for two years or more; he found that, on the other hand, in 28 cases treated by hyperextension the average disability was only five and one-half months. Watson-Jones states that in fractures of the dorsolumbar spine both compression and comminution type, treated by hyperextension methods, 80 per cent will resume their preaccidental work and the average incapacity will be ten months for heavy workers and seven months for light workers.

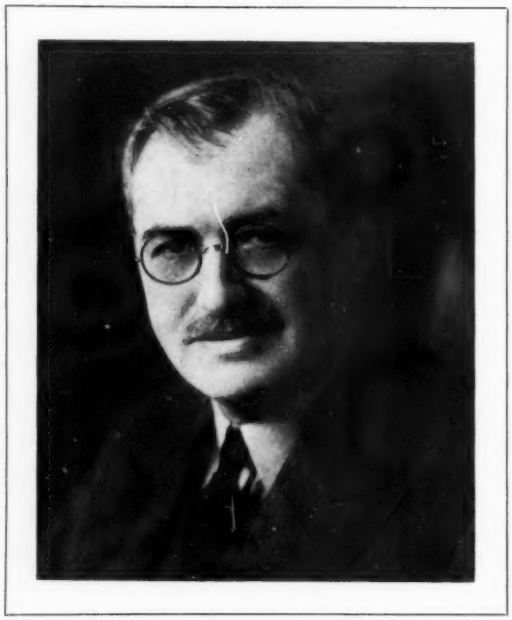
Bado applies the hyperextension treatment in supine position and in two steps under head traction followed by cast. According to him, the average disability in lumbar compression fractures is five to eight months with a maximum of eight to ten months; in dorsal compression fractures treated in the same manner, it is four and one-half to five months; and in cervical fractures similarly treated but using the Crutchfield clamp it was six to ten months.

The principle of reduction by hyperextension is simple enough, but to evaluate the effect of

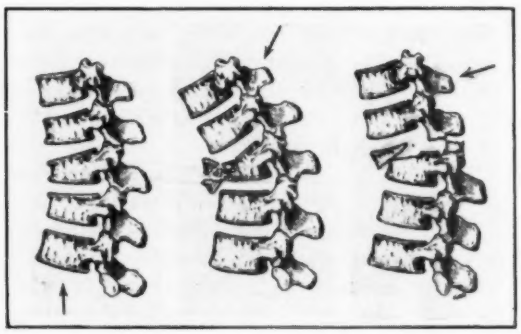
*Professor and Head of the Department of Orthopedic Surgery; former president of American Orthopedic Association; member of Board of Governors of the American College of Surgeons.

such hyperextension we must not only make a distinction between several types of vertebral injuries which are commonly designated as compression fractures, but we must also consider injuries to other than the bony structures because they are important factors for the persistence of late complaints and protracted disability. Watson-Jones distinguishes between the pure compression and the comminution or crush fractures (From Watson-Jones, Journal of Bone and Joint Surgery, 1938, p. 567).

In simple compression fracture the disk above and below the wedge-shaped vertebra is intact; in the comminuted fracture it is often ruptured or destroyed. The great majority of patients with simple compression fractures treated by hyperextension methods recovered without permanent symptoms, whereas in those with comminuted fractures complete recovery is much less frequently the case. There are several reasons for this. For one thing, the disk is often thinned out, and the intervertebral articulation is contused or fractured, encroaching upon the foramina. This fracture is to be treated by the same hyperextension method as is the simple compression fracture, but it is slow in consolidating and it demands at least six months of immobilization. It is particularly in such cases that late and indirect sequelae, such as arthritis, intercostal neuralgias, etc., are observed.



ARTHUR STEINDLER



Courtesy, "The Journal of Bone and Joint Surgery."

Figure 1. The three varieties of flexion fracture of vertebral bodies: (left) simple wedge fracture due to vertical compression; (center) comminuted fracture due to acute flexion angulation; (right) fracture-dislocation due to flexion with traversing momentum.

SEQUELAE

It falls to the lot of the orthopedist to see cases of compression fractures, after a more or less extended time interval, for residual and persistent complaints which under ordinary expectations should have disappeared at this time. Thus, the total overall picture of the damage—skeletal, muscular, ligamentous—presents itself to him, calling for analysis of the pathomechanical background of the injury.

In the compression fracture the anterior portion of the vertebra gives way and is crushed by the vertebra above. So long as the intervetebral disk is intact, it functions as the fulcrum. When it is crushed, the articular facets spread apart and subluxate or even dislocate. As this

occurs certain ligamentous structures become strained or torn; in sequence, these structures are: supra- and intraspinous ligaments, ligamentes, flava, capsular reinforcements, intertransversarii, the posterior longitudinal ligament, and finally, the posterior portions of the disk. Avulsions of the spinous processes may occur, and Key and Conwell present a case of actual splitting of the spinous processes due to tension of the supra- and intraspinous ligament.

In contrast, in the comminuted fracture the vertebra is flattened from above. It spreads out forward, backward, and sideways; and the effect is not so much the damage to the ligaments as that to the disk and the impaction of the intervertebral articulation.

All these secondary complications to the compression or comminution fracture of the vertebral body are responsible for the late sequelae to the injury. They are by no means always eliminated by skillful correction of the deformity, though it must be admitted that they occur much more rarely since the introduction of the hyperextension methods. One may well ask, "Why do sequelae occur at all if the primary treatment is adequate to take care of all injured structures, skeletal as well as ligamentous and muscular?"

For one thing, the primary fracture may be overlooked. We must remember that the diagnosis still depends largely upon the history: hyperflexion followed by localized pain in the back and pressure tenderness, with or without signs of radiation. The clinical picture may be dominated by indirect effects of the fracture. Navarre, for instance, called attention to fracture or dislocation of the sternum complicating fractures of the dorsal spine, and recently Bado described persistent and spontaneous sternal pain at Louis' angle with subluxation of the manubrium.

Another instance where fracture is often overlooked is in the osteoporotic spine. The injury here may be so trivial that no fracture is suspected. A slight jar or a ride over a bumpy road in an automobile may be sufficient.

Finally, sequelae occur when the reduction is incomplete, or when no reduction attempt has been made, or when retention of correction has failed because of inadequate plaster fixation.

What then is the nature of this secondary tissue damage and what part do its several components have in producing persistent complaints?

The deformity—It in itself is not disturbing because the gibbus is moderate. Nevertheless, patients complain of persisting pain even years after the injury. The reason for this may be threefold:

1. The disalignment itself produces unfavorable mechanical conditions for the back muscles and causes static fatigue and backache from muscular strain.

2. It is responsible for strain on the intervertebral articulations as they tend to separate or to impact.

3. The consolidation of the compressed vertebra is not always complete. The callus remains soft for a considerable time. In comminuted fractures where the disk is destroyed, fusion of the adjacent vertebra may develop; but this is not so in mild compression fractures where the disk is preserved. Thus it happens that severe comminution fractures healing by fusion may leave no symptoms, whereas mild compression fractures which are not fused may give sequelae for years.

Nonunion of fragments frequently causes pain. Bony spurs and bridges are usually seen in unreduced or poorly reduced fractures.

Intervertebral impaction and injuries to the articulations—With the compression of the vertebral bodies, the fragments may become impacted so that it is difficult to force them loose and to restore the normal height. The articulations are contused and smashed, and may become fused. There is, in addition, a variable amount of damage to the disk, and its disintegration results in the narrowing of the intervertebral foramina and in radiculitis with radiating pain.

Isolated fractures of the intervertebral disk are reported by Arcangeli with lateral protru-

sion, and there is also the case of T. Kocher authenticated by autopsy and described as early as 1896. Thus, although slight narrowing of the disk apparently does not cause persistent pain, marked narrowing due to distintegration may well do so because of the effect it must have upon the patency of the intervertebral foramina. The so-called meralgia paresthetica in trauma of the lumbar vertebra is due to destruction and compression of the disk, with narrowing of the intervertebral foramina. According to Watson-Jones, after reduction the intervertebral disk was found normal in 80 per cent of the cases.

A word may be said about so-called Kümmell's disease or posttraumatic necrosis. This condition actually was first reported by Verneuil in 1892 and later was described by Kümmell in 1894. It is supposed to be a rarifying osteitis due to vasomotor disturbances, which results in the breaking-down of the vertebral body long after the injury and in the formation of a kyphotic deformity. The characteristic feature is the period of latency between injury and deformity. The pathogenesis is still under controversy, but most authors now believe that there are minute fractures produced by the original trauma, and often a slight fracture, if untreated, may proceed to definite, painful kyphosis.

However, Gorsch in 1921, reported four cases in which the initial x-ray picture was found negative but in which later x-rays showed definite bony changes. This much is clear—compression fractures of the *vertebral* bodies that have no cord lesions often remain undiagnosed.

The intervertebral impaction is often seen in cases of osteoporosis, and it is remarkable how little impairment there often is to the ligamentous and other soft structures and how few are the permanent sequelae even in the face of multiple involvement of spinal vertebrae.

The secondary arthritis—Of all the possible sequelae of compression fractures, secondary arthritis is the most controversial point. Does the arthritis result from injury, is it aggravated by it, or do the clinical and x-ray signs indicate that the degenerative arthritis of the spine developed independently of the injury? The relation of trauma to arthritis must be judged, first, by the adequacy of the injury; second, by eliminating such soft-tissue injuries as may simulate arthritis; third, by strict localization of the arthritis at the site or neighborhood of trauma; and, fourth, by the so-called "bridge symptoms," which means unbroken continuity of complaints from the time of injury, though subject to the usual fluctuations which characterize arthritis. Localized spondylitic changes in the x-ray picture are found probably in as much as 75 per cent of the fracture cases.

If the arthritis exists before the trauma, it is very likely that it becomes aggravated by it. How can we tell that it is a posttraumatic aggravation and, if so, how long should it last? Above all, it is the history which must answer this question. Any sudden and immediate increase of symptoms may be safely taken as due to trauma, and may be credited to it just as long as one would expect the natural repair of the trauma to require, considering the age and constitution of the patient, and provided that adequate treatment has been given, since without adequate treatment there may be no repair at all.

One should not rely too much upon the x-ray picture. Previously existing arthritic changes, such as spurs and bridges, may be entirely asymptomatic, and the superimposed aggravation is likely not to be represented by any x-ray evidence whatsoever. The exacerbations are caused by strains and ruptures of inelastic and often calcified ligaments and capsular reinforcements, and they are much better evidenced by symptoms of radiation and spasms than anything that can be seen in the roentgenogram. The x-ray does not indicate duration or intensity of the subjective symptoms or the degree of disability.

When the arthritis deformans has reached the stage of ankylosis, it is unlikely that it can be aggravated by injury, since the ankylosis represents a definite, permanent, quiescent stage.

Bone bridges at the fracture site do not nec-

essarily mean hypertrophic arthritis. They are found in compression fractures oftener than in comminution (Watson - Jones). O'Donahue never found them in fractures successfully reduced by hyperextension treatment.

While we are on the subject we should also mention the strains of the costovertebral articulation as sequelae to fractures of the bodies of the dorsal vertebra. It is obvious that deformity resulting from the vertebral wedging must have its full effect upon the thorax.

Goldtwaite pointed out that as the chest sags and the head and shoulder are drooping forward a strain develops in the costotransverse articulations caused by a longitudinal twist of the ribs. From the upper ribs this strain may be thus transmitted to the sternocostal articulation. According to Brown, such strains vary with the anatomic type. In the slender type, where the facets sit at the anterior aspect of the transverse process, the downward slant occurs more easily than it does in the stocky type, where the costotransverse facets are placed nearer to the superior aspect of the process. When one sees how close the intercostal nerve lies and how taut the ligament and capsule of the costotransverse joint become with the drooping of the ribs, it is easy to understand that signs of strain of the nerve may develop, and, according to Carnett, many obscure thoracic and abdominal symptoms can be explained in this manner.

Persistent muscular and ligamentous strains —The greatest single factor to cause persistent pain in fractures of the spine are the strains and stresses of the ligamentous apparatus, especially the short articular, the intraspinous, intertransverse ligaments, and those of the extensor apparatus of the back, which includes the long sacrospinalis as well as the short and deeper layers of interspinosi, intertransversarii, and levatores costarum.

We remember that flexion occurs in a transverse axis going through the midpoint of the body of the lower vertebra close to the overlying disk. This range is normally from vertebra to vertebra; it is 7 degrees between the eleventh and twelfth dorsal, 6 degrees between the twelfth dorsal and first lumbar, and about 6 degrees between the first and second lumbar, according to Virchow. One may imagine what happens to the capsular reinforcements when a crushing injury causes enforced flexion of 20 or even 30 degrees.

The intraspinous ligaments and the ligamenta flava are still farther peripherally from the center of motion and therefore are under still greater strain on forced flexion. This strain manifests itself in deep-seated pain and tenderness associated with marked muscle spasm. It may cause the disability to be protracted over a year or more.

The disk itself suffers mainly from longitudinal compression, but there must also be a shearing effect, and the higher the vertebral junction the more must forced forward flexion be accompanied by shear, as the articular facets lose full contact and begin to spread apart.

As far as muscles are concerned, their strain in compression fractures can not be strictly differentiated from that of the ligaments. It would hardly be conceivable that a sharp forward flexion could occur without tearing some muscles, especially the deeper muscle layers. We call this traumatic myositis. In determining the relationship of myositis, the continuity of symptoms must be our guide just as it is in traumatic arthritis. An arthritis or myositis which is merely coincidental is likely to show a free interval. Muscular or articular damage which is an essential part of the fracture injury brings forth immediate, continuous, and, in case of neglect, increasing complaints from the time of the accident.

SPECIAL PAIN PATTERNS

The outstanding clinical feature of the persistent disability is pain—spontaneous pain, pain on motion, pain on pressure, local pain, radiating pain, and reflex pain. Others are paraesthesias and muscular rigidity. At first glance, the pain manifestations are rather complex and the picture is confusing; closer study, however,

reveals that the pain appears in patterns, which differ according to localization and to the nature of the injury.

Cervical—This type of pain reveals a threefold pattern.

1. Compression fracture of the upper cervical vertebrae are likely to involve the greater occipital nerve through injury to muscles and ligaments in the triangle between the rectus capitis posterior major and the obliquus capitas superior and inferior. This produces local tenderness at this triangle and radiation upward along the occipital bones to the top of the head and even forward to the frontal bone. There is definite rigidity of the deep posterior neck muscles.

2. Compression of the midcervical vertebrae 3 to 5, injuring ligamentous structures around the respective intervertebral foramina, may cause radiation along the superficial cervical plexus with its branches: articular, cervical, and clavicular.

3. Compression of the lower cervical, particularly 5 to 7, with injury to the soft structures around the foramina, will cause radiation along the brachial plexus and most often along the median nerve (paraesthesia of the second and third finger).

Dorsal—Local tenderness often persists, especially at the rhomboid region in crush fractures of the upper dorsal spine, due to unhealed injuries of the deeper back muscles and the ligaments in this region.

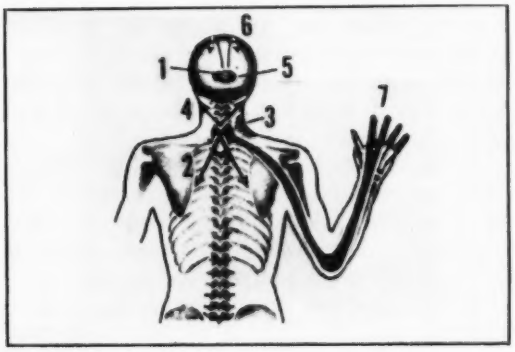


Figure 2. Local and radiating pain. Fractures of the cervical spine. (1) Occipital pain in fractures C4-5; (2) interscapular pain in fractures C6-7; (3) trapezius pain in fractures C7; (4) pain radiated to jaws in fractures C5-6; (5) pain radiated to base of skull in fractures C5; (6) occipitofrontal pain in fractures C5-6; (7) pain radiated to arm and fingers in fractures C6-7.

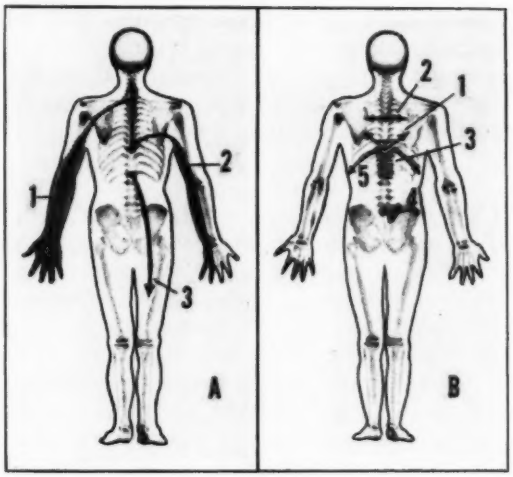


Figure 3. (A) Remote radiations. Fractures of the dorsal spine. (1) Pain radiated to arms and hand in fractures D1; (2) pain radiated to cervical spine, arms and hand in fractures D9; (3) pain radiated to thigh fractures D12. (B) Local and intercostal pain in fractures of the dorsal spine. (1) Intercostal pain to both shoulders in fractures D9; (2) pain to both shoulders in fractures D4; (3) mid-dorsal pain in fractures D8, D9, D10, D12; (4) lumbosacral, sacroiliac pain in fractures D12; (5) local and intercostal pain in fractures D7, D8, D9, D10.

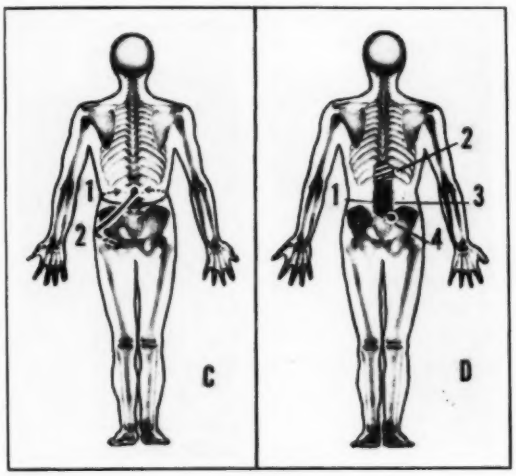


Figure 4. (C) Trunk radiations in fractures of the lumbar spine. (1) Girdle radiations in fractures L3, L4; (2) pain radiation to groin in fractures L2. (D) Local pain in fractures of lumbar spine. (1) Pain upon spinal processes in fractures D12, L3; (2) pain upon dorsolumbar region in fractures L1; (3) pain over lumbar spine in fractures L3, L4; (4) pain over sacroiliac region in fractures L12.

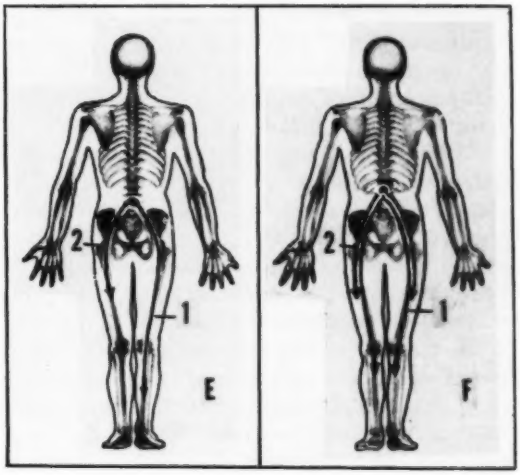


Figure 5. (E) Unilateral radiations in fractures of the lumbar spine. (1) Pain radiated to one leg in fractures L3; (2) pain radiated to one thigh in fractures L2, L3. (F) Bilateral radiations in fractures of the lumbar spine. (1) Pain along both legs in fractures L2; (2) pain radiated to both thighs in fractures L1.

Radiation along the intercostal nerves is frequent and persistent. Tenderness lateral to the spinous processes occurs in strain and injuries of the deep short muscles and to the costovertebral articulation and their ligaments.

Dorsolumbar junction—The encroachment of the intervertebral foramina in crush fractures of this region often produces radiation along the ilio-inguinal, iliohypograstric, and the external cutaneous nerves. The kyphosis which develops from poorly reduced crush injuries of the lumbodorsal junction undoubtedly has, by virtue of the compensatory lordosis, a static effect upon the muscles of the lumbar spine. Many patients persist in complaining of pain in the sacrolumbar and sacroiliac region, though the fracture site is the twelfth dorsal or first lumbar.

Lower lumbar spine—In this area the most common radiation is along the sciatic nerve. We believe it occurs only rarely by direct encroachment of the intervertebral foramen. More often it is caused by coincidental destruction of the intervertebral disk and occasionally it may be a pure reflex phenomenon connected with injuries to the sacrospinalis or to the deeper back muscles or to the adjoining ligaments.

THE conclusion derived from these observations on late, painful sequelae to the simple or comminuted fractures of vertebral bodies without cord injuries are simple and easily stated. There is, as you see, more to these fractures than meets the eye through the radiographic film. All such injuries must necessarily be associated with injuries to the soft structures, and, as in all skeletal injuries, the question

arises again: Are the measures these soft-part injuries demand, fully and adequately met by the treatment given to the skeleton, or do these soft-part injuries require special consideration over and above the skeletal treatment?

There is no doubt that reduction by hyperextension treatment of the fracture and adequate immobilization will take care of a good share of the muscular, ligamentous, and capsular injuries and will minimize the frequency of protracted and persistent complaints. Unfortunately, however, the majority of cases of crush fracture of the spine seen by the orthopedist show deformity due to failure of reduction. But even if reduced properly, the muscles necessarily become atrophic during the long period of immobilization; in this stage they are very susceptible to occupational and to static strains and thus keep up a continuous chain of subjective complaints. You will possibly recall that in recognition of this fact Magnus many years ago instituted his method of recumbent treatment with massage and exercises and without further immobilization. We should not advocate going as far as that. Yet, the principle of muscle development and exercise treatment is finding more and more acceptance among surgeons. Watson-Jones, for instance, advises exercises for spinal and abdominal muscles regularly for five minutes every hour of the day. After the cast is removed, which follows four months in compression fracture and after six months in comminution fracture, exercises are continued until normal muscle power is regained.

There will still remain some cases in which pain persists because the sustaining ligaments remain relaxed or because it is impossible to overcome the reactive spasm of the muscles and to restore them to normal power and endurance. For this minority of cases the fusion operation will probably be the only solution. In general, such operative interference is indicated for: (1) cases with persistent pain after months or years which resist all conservative treatment; (2) cases which are relieved only at rest and in which the pain returns on any kind of activity; and (3) younger patients who are relieved by rest and who, by wearing braces, are sufficiently relieved to carry on a reasonable amount of work, but in whom pain persistently occurs when the support is discarded.

CASE REPORTS

A. Without radiation. S. M., 17 years old, had an accident in September 1939, resulting in a fracture of first lumbar. There was no reduction. The patient was first seen in October 1939, and complained of pain in F, the lumbar spine and a gradually progressive list to the left with limitation of motion of the spine in all directions. The patient was treated by head and pelvic traction on curved frame for two months. Later a body cast was applied and worn for two months, followed by a corset. In September 1940, the patient still complained of pain

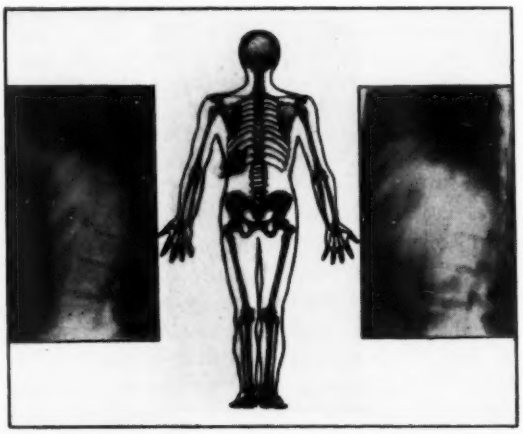


Figure 6. Local pain in fractures of the lumbar spine.

in F, the region between twelfth dorsal and third lumbar. Spinal fusion was performed. Result was complete relief of pain. Patient was last seen in September 1941.

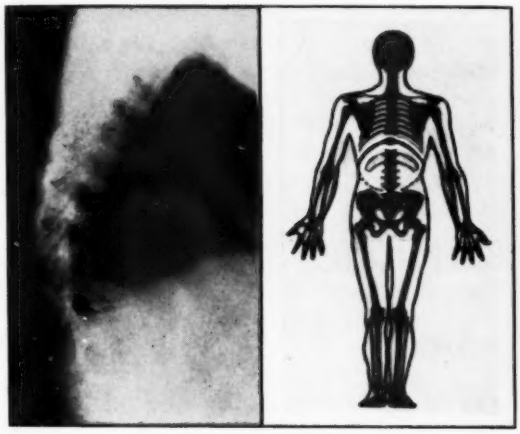


Figure 7. Pain radiation in fracture of the dorsal spine.

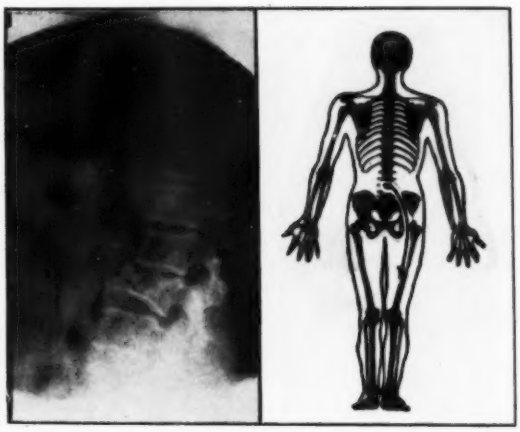


Figure 8. Pain radiation in fracture of the lumbar spine.

B. With radiation. D. I., 37 years old, had an accident in 1936, resulting in a fracture of F, the ninth dorsal. There was no reduction. She was first seen in 1937, complaining of back pain, aggravated by motion; she had no pain in the morning. The case was treated conservatively with only partial relief. In 1940 she started to complain of pain in dorsal spine radiating around both sides of F, abdomen to the umbilical region. She was put on bed rest without relief. Alcohol injection of the roots of the eighth, ninth, and tenth dorsals was performed, and following it she had complete relief of pain. This injection was repeated two months later because the symptoms reappeared. Later on, pain reappeared, and a chordotomy was performed. Results were inability to move toes, and involuntary bowels and bladder.

The third patient, 68 years old, had a trauma in 1932; there was no reduction. The patient was first seen in September 1936, complaining of pain in the lower back and coccyx, with radiation to the posterior surface of the leg. The treatment used was physiotherapy and corset, which resulted in complete relief of pain. Patient was last seen in June 1941, five years later.

SUMMARY

1. Late and persistent painful sequelae are ever present in unreduced or poorly reduced compression fractures.

2. Complete reduction by hyperextension treatment greatly reduces, but does not entirely eliminate, incidence of persistent pain.

3. Fusion in cases without radiation, which resist conservative treatment, almost always gives relief.

4. Fusion in cases with radiation, which resist conservative treatment including recumbency, may not give relief if the radiation is due to herniation of the disk, or to nerve compression in the intervertebral foramina.

5. These cases need special surgical measures.

The Diagnosis and Treatment of Peptic Ulcer

DONALD C. BALFOUR*

MAYO FOUNDATION, GRADUATE SCHOOL, UNIVERSITY OF MINNESOTA, ROCHESTER

THE STATUS of the ulcer problem is always worthy of review. There are many hypotheses as to the cause of ulcer but they are still, in the main, hypotheses. It is generally recognized, however, that acid is the most common factor associated with ulcer and recognition of this factor is largely the basis for the management of ulcer. Indications for choice of management, nevertheless, are still debatable because of the many factors which influence the results of treatment, and, although general principles may be set down, details of management vary with the lesion and with the individual patient. The evidence that management of ulcer is still a debatable subject is in the continued suggestion of new procedures, both medical and surgical, as well as in the revival of old and more or less discarded forms of treatment. There is also evidence that the disease itself is changing in its manifestations. It is for all these reasons that the subject is always a timely one.

Peptic ulcer is particularly important at present, since all disorders of digestion, whether of organic origin or not, assumed increasing significance during the war, and, in this postwar period, probably will present to the medical profession problems which never before have been encountered in such degree. The evidence forthcoming thus far from our own armed forces and from those of other countries bears out the experience of the previous war that, in periods of national stress and strain, those conditions of which stress and strain are assumed to be directly or indirectly causative will appear in much greater incidence. Estimates in the armed services indicated that approximately 50 per cent of cases of dyspepsia were due to ulcer. Nevertheless, there may have been no actual increase in incidence of the disease as the result of war; possibly, the war merely drew attention to the fact that peptic ulcer and gastritis are of more common occurrence than was supposed. The army did not lose many useful men because of gastric disabilities.

The following interesting data were reported from the British Medical Services: In a follow-up study of 103 cases of perforated peptic ulcer in which operation had been performed at a Royal Naval Hospital between 1924 and 1934, 44 per cent of the patients were still on active duty in the Royal Navy in 1944. The interesting comment was made, moreover, that the higher the rank, the more likely the patient is to be able to carry on. It was also stated that

*Professor of Surgery, Graduate School, Mayo Foundation for Medical Education and Research of the University of Minnesota.

neither length of history nor criteria for diagnosis offer any guidance as to whether the patient can withstand service life. The figures coming from the medical services of the various countries engaged in World War II are rather difficult to evaluate. In an article in the *Canadian Medical Association Journal* it is stated that the total incidence of gastric ulcer among casualties in the Red Army was 17 to 18 per cent. The interesting recommendation has been made that sufferers from functional dyspepsia should be kept on duty.

DONALD C. BALFOUR

In the diagnosis of peptic ulcer, great advances have been made through increased knowledge of the clinical manifestations of ulcer and through increasingly accurate use of roentgenology and gastroscopy. There are, however, and always will be, difficulties in interpreting dyspepsia and the relationship of ulcer to it. In typical cases of peptic ulcer, the diagnosis will be clear both from the history and from the roentgenologic report, but it is important to avoid the danger of focusing attention on the ulcer and overlooking other pathologic processes which might be of even greater importance. The diagnosis of gastric ulcer is seldom difficult. The only problem is whether or not the ulcer is malignant.

In contrast to the cases in which the condition is readily recognized, there are still many cases which present problems for the practitioner. First to be considered are those cases in which there is a good history of ulcer, but repeated roentgenologic and gastroscopic examination does not disclose the lesion. However, when a history appears typical to those with experience in this field, it is rare for ulcer not to be found if the patient comes to operation. Ulcers which cannot be identified are usually on the posterior wall of the duodenum, and deformity has not occurred or, if it has occurred, it has not produced any indirect signs which can be recognized in the roentgenoscopic examination.

The second important group includes those cases in which the symptoms may suggest ulcer but the continuity of symptoms is more suggestive of pylorospasm. It is in this group of cases that it is important, although difficult, to determine whether or not an ulcer exists in addition to spasm. There are, of course, many combinations of these atypical findings. One of the most important points, the reverse of which I already have mentioned, is that other lesions may mask the presence of the ulcer and give rise to a wrong interpretation of the symptoms.

Recently, I saw a patient whose major complaint was a sense of pressure in the upper part of the abdomen and lower part of the thorax, together with regurgitation of food. Examination elsewhere had disclosed a large diverticulum in the lower third of the esophagus. The development of the history was so completely directed towards its relationship to the diverticulum that a typical history of duodenal ulcer was more or less obscured. In further examination of the patient, a large duodenal ulcer was identified together with marked edema of the

pylorus and moderate pyloric obstruction. The diverticulum had been of such size and the patient's distress so marked that surgical removal of the diverticulum was contemplated. Indications, however, were completely changed when it was learned that many of the patient's symptoms were, in all probability, due to the ulcer. Then he was advised to go on an ulcer regimen, and the hope was expressed that, by dietary management, he might be able to control his symptoms to such a degree that operation for the esophageal diverticulum might be unnecessary and the possible serious outcome of such an operation, both immediate and subsequent, might be avoided.

THE general indications for treatment of ulcer are rather well established. The following principles are generally accepted:

1. All patients who have duodenal ulcers in their early stages are considered amenable to nonsurgical management. I always have felt, however, that some surgical procedure might be developed for dealing with those ulcers which have become established even though, from a pathologic standpoint, they are only in their early stages.

2. It is said that nonsurgical management should be employed for cases of duodenal ulcers in which the symptoms are mild, recurrence is rather infrequent, and fairly good control by nonsurgical measures is attainable.

3. Certain small gastric lesions which can be carefully observed roentgenologically and, if necessary, gastroscopically are considered amenable to nonsurgical management. In fact, however, this type of management should not be employed in such cases since it is rather dangerous. Even complete healing of a small gastric lesion does not eliminate the possibility that the lesion harbors malignant cells.

In contrast to the indications for nonsurgical treatment, the indications for surgical care in the first group of cases are, in general, uncontrollable symptoms regardless of the time the ulcer has existed. A second group of cases in which surgical operation can be considered are those in which the patients are unwilling to continue with strict nonsurgical management and prefer to undergo operation. This preference, of course, should not be given consideration unless the patient has had the ulcer long enough for it to be classified as a chronic lesion. As has been said, the patient may request operation rather than face certain minor adjustments. As long as this mental attitude remains, any treatment is doomed to failure. A third group of cases in which surgical measures are desirable is composed of those in which the circumstances of the patients make it extremely difficult for them to follow a regimen which will keep the ulcer under control. In a fourth group of cases, the indications for surgical operation are the complications which may be associated with the ulcer.

In connection with complications, one of the most interesting problems, which is still unsolved, is the significance of gastritis in association with ulcer. There is growing evidence that gastritis and duodenitis play quite prominent parts as precursors to ulcer, as factors in its recurrence, and as elements which influence the results of management. Experimental and clinical work bear out this assertion, but more knowledge is required to establish the relationships that have just been mentioned. Many observers believe that chronic gastritis is not only the background of peptic ulcer but also of pernicious anemia and carcinoma. But since duodenal ulcer, particularly in young people, may be associated with perfectly normal gastric mucosa, it would seem more logical to think that gastritis is secondary to ulcer. In the armed forces it is important to differentiate between so-called psychoneurosis associated with dyspepsia and chronic gastritis.

In cases of ulcer associated with hemorrhage the indications for surgical treatment are perhaps somewhat changed. It is accepted, of course, that it is safer for the patient who has repeated hemorrhages from an ulcer to undergo operation than to risk the results of further hemorrhages. The attitude of the medical profession towards the management of acute hemorrhages is gradually changing. It formerly

was accepted that, in the presence of acute, massive hemorrhage, a higher percentage of recoveries would follow nonsurgical management than surgical management, and much work has been done in an attempt to determine when operation would give a greater chance of recovery than would be given by nonsurgical management. Until recently most surgeons, I believe, felt that, although some patients would succumb to hemorrhage from a large eroded vessel, the difficulty of determining which case would terminate fatally, if operation was not performed, was too great to justify any surgical interference.

Present advances in surgical management of ulcer, however, particularly with respect to the use of blood and blood substitutes in cases of massive hemorrhage and shock, would seem to indicate that radical surgical measures and replacement of blood could be carried out without prohibitive mortality in cases in which bleeding is obviously continuing. Such management, of course, is more clearly indicated if patients are beyond middle life than if they are younger, for it has been shown that the mortality rate of gastric hemorrhage from ulcer is chiefly in this older group.

A word about acute perforation of ulcer: Expertness in diagnosis, skill in technic of gastric operations, and the use of chemotherapy have helped to further an ideal in the management of acute perforation. That ideal can be expressed as follows: Not only should surgical measures save the life of the patient but they should give the highest measure of protection against recurrence of the ulcer and of another perforation. Also, more radical procedures for acute perforation than simple closure should not be carried out unless they can be done as expeditiously as the practice of modern surgery makes possible.

I shall now return to some of the major principles in the management of ulcer. The success of nonsurgical treatment is in direct proportion to the patient's understanding of the disease, and it is therefore essential that the full and continued cooperation of the patient be obtained. "Unfortunately, the characteristics of restlessness and irritability which play such an important part in the development of the ulcer make it difficult for the patient to cooperate with respect to treatment. However, he must be made to understand that there is for him no easy road to health and that his cooperation must extend over a period of years rather than days and during long intervals when he is asymptomatic and when he thinks his ulcer has been cured. Too often the ulcer patient's perennial optimism is a most serious pitfall; he is ready to follow a treatment program when suffering pain, but it is almost impossible to get him to maintain adequate precautionary measures when he is comfortable."* It is for this reason that hospitalization is so essential, for, in a few days in the hospital, a physician can usually convince the patient that there are factors in the causation of ulcer over which the patient himself has control and that, in the long run, success will depend largely on how conscientiously he adopts simple rules as a part of his routine of living.

Concerning cases in which surgical management is indicated, certain general principles might be pointed out. Of these, the cardinal principle to be followed—and this applies also to nonsurgical management—is that the objective is to modify gastric physiologic processes. To what degree they should be modified, however, is still to be settled. In gastric ulcer the problem is simple, because one of the requirements of operation is that the ulcer should be removed and the operation of excision and gastroenterostomy usually gives satisfactory results, both because symptoms are relieved and because jejunal ulcer is an extremely rare sequel. Partial gastrectomy, however, has become the operation of choice. It is interesting to note, in this connection, that extensive gastric resection for gastric ulcer is not emphasized as a protection against recurrence of the ulcer; this is further proof that the liability to recurrence after

Presented before the 1944 Assembly of the Interstate Postgraduate Medical Association.

*Morlock, C. G.: The present status of the treatment of uncomplicated duodenal ulcer. Proc. Staff Meet., Mayo Clin. 19:449, 1944.

any operation for gastric ulcer in which the jejunum is united to the stomach is minimal.

It is concerning duodenal ulcer that much discussion continues as to the best surgical procedure. One of the most interesting chapters in the history of surgery has been the one which might well be entitled "From Pyloroplasty to Gastrectomy." The great number of operations and combinations of operations that have been employed have the same purpose, namely, to reduce the motor, sensory, and secretory mechanism of the stomach to a point at which ulceration will not recur. The ideal surgical treatment of duodenal ulcer, therefore, might be expected to be derived from application of those procedures which in the past have given excellent results in certain groups of cases. The difficulties of decision, however, have been great because of uncertainty as to the degree of ulcer diathesis presented by different patients. In some cases, simple pyloroplasty would give permanent and splendid results, whereas, in other cases, the same operation, under apparently the same conditions, would be followed by recurrence of ulceration. For this reason, many other procedures designed to control hyperactive gastric function have been abandoned in favor of partial gastrectomy. To give no consideration to any other surgical management would be a questionable course, however, for two important reasons: (1) These other procedures will, in certain cases, give excellent and permanent results; (2) as yet, the late results of extensive partial gastrectomy performed on young persons is unknown.

Finally, another word about recurring ulcer: This lesion may occur after any type of operation, and it has now been proved that partial gastrectomy does not by any means guarantee that an ulcer may not develop. As a matter of fact, in institutions wherein partial gastrectomy has been performed in the greatest number of cases, relatively recent reports show that ulcer has recurred in more than 9 per cent of cases. This illustrates a principle; namely, when ulcers recur, there exists in the affected patient a particular tendency to their recurrence, and the circumstances necessitate a more radical change in gastric physiologic processes than has been brought about by the operation performed. When this marked liability to recurrence is encountered and the jejunum is quite obviously expressly vulnerable to gastric juice, an operation which will restore direct continuity of the stomach and duodenum has an advantage in principle. This is particularly true if repeated gastric resections have been done for recurring ulcer. In such cases, it is well to disconnect permanently the jejunum and the segment of remaining stomach and to unite this segment and the duodenum.

In general, the status of peptic ulcer today is one of which the medical profession may be proud. Recognition of the disease has taken its place among the great advances in medicine; nonsurgical management has become much more efficient than it was; and surgical treatment has become better understood, particularly in regard to the selection of patients for operation and in regard to the selection of operation for the patient.

Diagnosis and Treatment of Schizophrenia

KARL A. MENNINGER*

WINTER VETERANS ADMINISTRATION HOSPITAL AND THE MENNINGER FOUNDATION, TOPEKA

About fifty years ago there were so many different kinds of "madness" in the books, or at least on the registers of the state hospitals, that all psychiatrists welcomed the work of Emil Kraepelin of Germany who proposed to group together quite a few rather widely dissimilar conditions into one large category which he called "dementia" (because these conditions all seemed to have a malignant tendency and to tend toward deterioration) plus "praecox" (because this deterioration seemed to begin early in life). While it was a great step forward for him to group all of these conditions together and to invent this term "dementia praecox," it was subsequently discovered that his inclusions had been rather too broad, and that his inferences as to the malignancy of the condition, its deteriorating tendency, and its "precocious" appearance were somewhat unjustified. The name had the effect of making psychiatrists even more pessimistic than the public; if a patient developed symptoms that could be put into this general category of "dementia praecox," it became almost a foregone conclusion that the patient was hopeless. The doctors felt that way and acted that way, with the result (partial) that the patient often turned out to be that way. This is in spite of the fact that Kraepelin himself specified that a very considerable proportion of these patients seemed to recover.

Then a Swiss psychiatrist by the name of Bleuler came along who pointed out that the fundamental similarity in these cases was not the tendency to "dement," nor yet the tendency to begin early, but rather certain psychological peculiarities which could best be described as a kind of splitting of mental functions, a disturbance of the powers of association and of the normal connections of the emotions with ideas. He introduced the name "schizo" (split) "phrenia" (mind).

Before I plunge into the details about schizophrenia, I would like to talk rather more generally about the fact that doctors are so little prepared for seeing the indications of schizophrenia as compared to their preparation for seeing the indications of coronary sclerosis. It is generally agreed, I believe, that in the practice of medicine—outside of a few specialties—at least one-half of the cases which the average doctor sees in his office are cases of illness the like of which he never saw in medical school, the nature of which he was taught nothing

*Manager, Winter Veterans Administration Hospital; Director of Education, Menninger Foundation; author of *The Human Mind*, *Man Against Himself*, and *Love Against Hate*.

about in medical school, and the treatment of which has to depend upon his ingenuity, his common sense, and his temperament rather than upon any scientific training that he has had in the past.

This 50 per cent of the practice of the physician is made up of conditions that are sometimes described in a broad way as psychiatric in nature. Perhaps we should put it a little differently and say that they are cases in which psychological and social factors determine the symptomatology more than do spontaneous or traumatic organic lesions. I find it helpful to think of it this way: Perhaps a third of medical practice consists of cases of organic pathology of the type shown in the scientific exhibits of every good national medical meeting. Another third of this practice is made up of cases in which there are a good many physical indications of illness, but indications connected so closely with the emotional life of the patient that while the doctor may begin by treating a part of the patient—his back or his head perhaps—he ends up by having the whole patient to treat, with all his troubles, his marital difficulties (sometimes his extramarital difficulties), his economic difficulties, and everything else. The final third of the cases constituting the practice of the average physician is made up of patients who certainly are obviously psychiatric; they are cases in which symptoms are many and the signs few, in which undoubtedly the patient suffers, and usually the doctor. The patient has symptoms that distress the doctor partly because he (the doctor) doesn't know what to do and partly because whatever he does seems to be wrong. Or the doctor may realize that the proper consideration of the patient's symptoms take so much more time than the doctor has available in his busy life that he enters into any treatment at all with a certain grudge against the patient which defeats him before he starts. Hence very often he gets rid of the patient as rapidly as possible with the hope that someone else will do the job.

The patients in this third category go by various names. Not all of them, by any means, can be said to suffer from neuroses, though of course many of them do. Some of them are suffering from something more malignant. It is a very common error on the part of the general physician to think that any patient whose complaints seem grossly to outnumber his physical signs of illness is a neurotic. Many of them are not neurotic but *psychotic*.

WHAT is the difference between psychotic and neurotic? In everyday language you know well enough what the difference is. A psychotic man, a patient with a psychosis, is what is popularly known as "crazy." He is irrational, he is unpredictable, he is not entirely responsible, he is perhaps potentially or actually dangerous to himself or to the community. Such indeed is the picture of the full-fledged psychosis in most instances. But in the early stages a psychosis does not take on these malignant features. It may appear very much more in the form that many physicians regard as typical "neurosis," i.e., a condition in which the patient complains a great deal about something for which there seems to be no organic cause.

The commonest psychosis which masquerades as a neurosis—or sometimes as a mild physical ailment or even as a surgical condition—is schizophrenia. Schizophrenia is one very important, if not the most important, form of serious, malignant mental illness. By malignant I do not mean that it is incurable; a great many cases of schizophrenia do not become seriously ill, and a large number of them recover even after they have become seriously ill. But there are so many cases of this illness in the country that it is still possible to say that a large number go through your office and are called by you cardiac disease, appendicitis, malingering, and neurosis when they are actually primarily just plain schizophrenia—a fact which will probably sooner or later become evident. In any psychiatric hospital most of the patients with well-developed schizophrenia have been previously treated by doctors who thought the patient had a physical disease or a neurosis.

"What *is* this schizophrenia, then? Surely it is something that I am missing, for I do not see

very many cases in my office that I would consider psychotic. You say it is so common, but I'll have to be convinced. I am sure that I did not remotely suspect that I was seeing it."

You are quite right; I am sure that you did not suspect it. In order to make you more suspicious of the existence of such cases, let me cite a few examples.

You are called to a private home to see a young boy of 18 or perhaps a woman of twice that age. The family tells you that this beloved member has been acting queerly, talking somewhat irrationally or inconsistently, and in general showing strange, pointless behavior out of keeping with his or her previous pattern. The chances are ten to one that you are observing an acute instance of schizophrenia and that you are well aware of it. Naturally you would exclude febrile delirium or hysteria—both of which are relatively rare—or intoxication—regrettably somewhat more common—and other conditions which it might be. Excluding these conditions you are almost certainly right that this is a case of schizophrenia. Inquiry from the family will probably supply the information that this strange behavior has been rather irregularly developing over a period of several weeks or months. The symptoms may have been of a quiet, silly, dreamy type, or they may consist of more or less hostile, suspicious, sullen, and delusional behavior, or they may be of a noisy, combative, disorderly type. We are all familiar with these three general pictures of disturbed (psychotic) behavior; what is common to them all is their irrational, illogical, unpredictable nature.

Such cases are easy to recognize, as I have said. Any good third-year medical student would be able to recognize them if he had had any psychiatry at all. But such a case represents only one stage of schizophrenia, an acute advanced stage of the disease. It is a little like a hemoptysis in tuberculosis. A sudden hemorrhage in a person who is not suspected of tuberculosis startles us, and we wonder why we have not noticed it before. We know that a process has been developing over a period of time. Such a patient bleeds, he is rushed to a sanatorium, gets early treatment and has a better prognosis than the man who is suspected only of having a chronic cough or a bronchiectasis or something of the kind and is given no treatment until he is thoroughly under the domination of a tuberculous infection.

Something of the same sort is true in schizophrenia. The type of case I have described is easy to recognize, and it is apt to be rushed away to immediate treatment and thereby get better treatment and better results than the more slowly developing cases which are far more common. I would say that the slowly developing cases are ten or twenty or maybe even fifty times more common than the picture that I have just described. It is important for the doctor to know these cases in their earlier stages, if possible. Therefore, having given you this rather typical picture of the advanced case, let us get back to the earlier symptoms that one might have noticed in the same young man or woman had we seen him or her a year or two years or five years earlier.

In the advanced stages of schizophrenia it is easy to see that the patient seems to have abandoned his loyalty to reality and his common-sense discriminations with reference to the facts of life that we have all learned about through painful experience, and he seems to act as if he were in a dream. Indeed, schizophrenia has sometimes been likened to sleepwalking. The characteristic thing in a dream is that the laws of gravity, time, space, color, identity, and the like no longer hold. This is precisely the way a patient with advanced schizophrenia acts; he acts out a dream instead of acting according to reality.

In the earlier stages of schizophrenia one can often detect this unrealistic, impractical, dreamlike quality, but only by careful scrutiny. The trouble is that so many people—all of us in fact—have spells of it that it is a little difficult to say which person is developing what might be called a malignant dreaminess, a malignant impracticality, and unrealistic attitude or approach to life. We all do a certain amount of

daydreaming, self-deception, and scotomatizing of realities. But the normal person has a tendency to "come back," or to "snap out of it," and to pitch into life again for what it actually is and not for what he wishes it were. The potential schizophrenic patient, however, has a tendency to go the other way as if he found the world of real life too painful to endure.

I am well aware of the fact that I have made this appear much too simple. A sensitive child grows up in what is for him a harsh world or a cruel world, and instead of committing suicide he merely relapses and regresses into a dreamlike state, which becomes more and more obvious, and there you have it—schizophrenia. The only trouble is that that isn't the way it usually happens. Plenty of children grow up in what appears to be the best of environment and yet develop schizophrenia, whereas plenty of others grow up amid hardships and sufferings aplenty and come nowhere near having schizophrenia. Indeed, some of the latter seem to be all the more realistic in their adjustments.

THIS has led many psychiatrists to believe that a special tendency to schizophrenia, some kind of hypersensitiveness at least, is transmitted by heredity. There is no proof of this, however. There is much proof that the injuries suffered by those individuals who later become schizophrenic occur very early in infancy. It may be the death of a mother, neglect or harshness by the mother in a form which she herself does not at all recognize, incessant quarreling between the parents, hopeless rivalry with a much more popular or much more beautiful sister—all these things can do it, and many more which occur even in the most gentle and kindly and affectionate of families.

In general, what happens is that something in the nature of an unendurable disappointment or wound causing unassuageable anger occurs in a person with a special sensitiveness and with inadequate devices for psychological adjustment. I trust it is clear that such an individual doesn't develop schizophrenia right away. He is only a 2-year-old child, let us say, or 3 years, or 4 years at most. Many other events happen subsequently which reinforce the original injury. It may well be that there is a certain unfortunate concatenation or repetition of such blows that actually causes the illness.

Children injured in this way are apt to develop certain defenses. They "cover up," as the slang expression puts it. They deny the injury which they have experienced or the pain which they are suffering. They erect a façade or front. "All's well with me," they seem to say, "I am one of the fellows; I am just like everybody else. I am a normal person." And indeed they act like normal persons, as much as they can. They go to the same schools, they complete the same work, they do the same things that all the rest of us do. Often they are noticeable only for a certain reticence, shyness, or perhaps a slight eccentricity. Just as often they are not conspicuous at all. So much of this depends upon their ability or luck in maintaining this false front.

What is underneath that front? One might say that the same sort of thing goes on in the emotional life that goes on when an abscess slowly develops beneath the surface of the body, for example, in the lungs or in the liver. There has been an injury, an infection. Counteracting processes have been set up so that tenseness and pressure and potential pain are gathering. But all this is concealed from the outsider. If such patients subsequently develop schizophrenia, we know that long before the outbreak of the illness there is evidence of an intense conflict, tension, and anxiety, and strong feelings of bitterness, resentment, and hate toward those very people with whom the external relationships may be perfectly normal. "I hate them! They don't treat me right. They will never love me and I will never love them. I hate them and I could kill them all! But I must not let them know all this. I must cover it up, because they might read my thoughts, and then they wouldn't like me and wouldn't be nice to me." All this is covered up by trivial conversation, pleasant greetings, chat about the movies or the picnic and the next dates, and the rest of the ordinary things of adolescent or early adult life.

Thus, one might say that the chief problem in the person who is going to develop what we call schizophrenia is, "How can I control the bitterness and hatred I feel because of the unendurable sorrow and disappointment that life has brought to me?" His efforts to control it often show themselves in various kinds of withdrawal: lone-wolfishness, seclusiveness, even mild suspiciousness, or just a quiet going of one's own way with disinterest in active social participation.

It is this which we must consider to be the earliest signs of the unrealistic qualities which I mentioned above as being typical for this condition. It is very difficult to detect these things. I can assure you that every psychiatrist has a great many cases in which he finds it difficult to decide whether or not the patients are potential schizophrenics. He often cannot decide even after he has obtained a complete life history, though by then it may be simpler.

FORTUNATELY, we are not entirely helpless in the matter of diagnosis, however. Many of you will recall that before the Wassermann test for syphilis was introduced, a man was not recognized as having syphilis unless he had open lesions or some of the other well-known clinical manifestations of syphilis. Sometimes we were not certain about the diagnosis from the observation of the lesions alone and in these cases particularly we were very glad when the Wassermann test was discovered and proved to be of clinical usefulness. Then we discovered that many had syphilis who had no visible lesions at all!

In the same way there have been devised psychological tests which are useful to psychiatrists just as a Wassermann test is useful to an internist. They not only help to make a definite diagnosis in doubtful cases, but they can be applied to apparently normal patients, and in such patients they reveal the presence of schizophrenic tendencies which do not show in any clinical way.

The average psychiatrist cannot do these tests. I cannot do them any more than I could do a Wassermann test, though I learned about it in medical school. But I do know what the results of a Wassermann test mean, and I do know what the results of such psychological tests mean, and I respect them equally. Using such tests, we know now that a great many cases that we used to call neuroses, neurasthenia, alcoholism, chronic invalidism, and many other things are actually cases of schizophrenia. Hence, today we have a concept of schizophrenia very much broader than the one we used to have in the old "dementia praecox" days. We know now that there are actually many schizophrenics who do not become patients—indeed who never become patients, neither yours nor mine. They often do very creditable and capable things in the world. Nevertheless, they are potential schizophrenics.

As in the case of coronary sclerosis and diabetes, the regimen under which they live has much to do with their successful adaptation. Given certain new stresses, the façade may break down and the underlying bitterness and conflict may break through. The patient may suddenly begin to hear voices talking about him saying that he is mean, that he is hateful. Or he may begin to detect the hostility of other people in a far larger measure than could possibly be true. He may begin to consider himself persecuted.

Or the break-through may be like this: A little girl who was one of the most popular members of her community, president of her high school class, and prominent in her Sunday school, calmly walked into her father's bedroom one night and shot her father with a revolver. Then to help matters along, she went into the next room and killed her brother. The following day she was the same "sweet, pleasant, demure, but somewhat shy girl" that she had always been. No one could believe, at first, that she had really committed the double murder. No one could believe, either, among those who knew and loved her, that she had schizophrenia. But the psychological tests showed it very clearly. One reads about cases like this in the newspapers very frequently.

THE most important cases of overt schizophrenia are not those in which the break-through appears in such aggressive and violent, direct action as I have described. In fact, most cases of schizophrenia are not dangerous. The commonest type of break-through, the one that is most familiar to the doctor, is that in which the conflict appears in the form of physical symptoms. These physical symptoms usually appear as chronic pains in the abdomen or in the back or in the head. I could fill many pages with case histories of such. A very successful saleswoman began to feel nervous and jittery when she was 44 years old. This was ascribed to the menopause. She began having recurrent attacks of pain in the back, feelings of anxiety, and tremblings of the hands. She was given the usual medication for the menopause. This was of no particular benefit to her. She went from physician to physician; during the year in which she was examined by me she had seen 8 other physicians all of whom had assured her that there was nothing seriously or organically wrong. However, a careful psychiatric examination, confirmed by psychological tests, showed that there was something very seriously wrong; she was developing an overt schizophrenia. A year later she was in the locked wards of a psychiatric hospital.

The surgeon sees more of these cases even than the medical men, I suspect. And the surgeon is apt to be taken entirely unawares by them. I am not talking now about those cases which develop schizophrenic symptoms after an operation. This sometimes occurs. I am speaking of cases who come to surgeons with symptoms that suggest a so-called chronic appendicitis and other vague surgical affections. Sometimes the operation is very definitely indicated. Furthermore, the curious phenomenon is often observed that an operation seems to postpone the outbreak of schizophrenia and sometimes to control it. I have seen many of these patients who have had operation after operation each time based upon physical symptoms to be sure, but symptoms which developed in connection with the threatened outbreak of their schizophrenic tendencies.

I certainly don't mean by this that I think surgeons should operate merely for the purpose of forestalling schizophrenic attacks. Sometimes it has the opposite effect as I have already mentioned. Furthermore, no surgeon wants to have his surgery turned into a placebo method. As yet we do not exactly know what to do with such patients, and it is a safe rule that the best thing to do is simply to follow the necessary indications for imperative surgery.

When a case is definitely recognized to be one of schizophrenia, most physicians want to get rid of that patient. In this they are very wise. Of the many psychiatric conditions which physicians and surgeons who are not psychiatrically trained can and should handle, schizophrenia is not one. By its very nature, as I have described it, which is that of repudiating reality and living in a self-limited, self-defined, self-created, self-ruled world, the schizophrenic patient puts himself outside the jurisdiction of conventional medical practice. All psychiatrists believe and advocate that general physicians, internists, and surgeons should treat many psychiatric patients. They have to, as a matter of fact. There are not enough psychiatrists to take care of one-fourth of the number of psychiatric patients now known to be seeking medical help, and there will not be enough psychiatrists for many years. But in spite of this, I do not think that physicians and surgeons should attempt to treat schizophrenic patients. They are the most difficult, the most delicate, the most potentially disastrous of all psychiatric patients.

I know that some physicians feel justified in administering electric shock treatment as soon as they detect what they consider to be schizophrenia in a patient. Psychiatrists in general, and I in particular, strongly condemn this procedure. In the first place, electric shock is by no means the treatment of choice—if indeed it is of any use whatever—in schizophrenia. Insulin shock is sometimes beneficial, but it should be done only by someone with a great deal of experience in the selection of cases and in the administration of the treatment. Furthermore, it is generally agreed among psychiatrists that the effective use of any kind of shock

therapy involves the strategic application and careful timing of psychotherapy, and to do this without preparation simply because one can apply an electrode or give a drug intravenously is both dishonest and dangerous. Indeed, it is, in my opinion, malpractice.

NO, THE treatment is not shocking the patient, but just the reverse. When it can be accomplished, the favoring of a natural reconstruction of the front that I have described, the encouragement of a psychological healing process within the patient by the proper kind of environmental situation and the proper attitudes on the part of the people about the patient—that is the treatment of choice. In very simple words, I mean that such patients often recover if placed in an environment in which it is not necessary for them to be afraid of their own fearful aggressiveness and resentment. Having been relieved of this fear, they can gradually and firmly reconstruct the front with which they ordinarily meet social contacts. Often, but by no means always, this means an institution; perhaps much more often it means finding an environment in which, outside of an institution but often outside of the home, the patient can successfully adjust himself. Above all, such patients should not be allowed to get into situations which they cannot stand, and if they are already in situations that they cannot stand, they should be removed to situations which require less of them.

Whether a patient requires, in addition to such a change in his life situation, the special psychotherapeutic treatment which a psychiatrist can give would depend upon the individual case and upon the severity of the symptoms. The vast majority of schizophrenics at the present get no treatment, but many of them would be very much helped by some protective, supportive treatment which their family physician could give them. A great many could undoubtedly be improved, if not cured, by the proper type of special psychiatric treatment.

The prognosis of schizophrenia is much better than most people think. If one is going to judge it by the terrible cases—and they are too many and too terrible—that never get well, cases which fill the state hospitals, then one has a right to be pessimistic. But one should remember that these thousands constitute *a small minority* of the total number of cases of schizophrenia. I am not speaking now of the latent cases of schizophrenia, but even of the overt cases. If a medical student was shown only the advanced, ulcerative, disseminated stage of carcinoma, he would certainly come to the conclusion that it is an incurable disease. Yet we all know that early cases of carcinoma can be successfully treated and are being successfully treated. *Schizophrenia has a much better prognosis than carcinoma,* and on the same basis, namely, that it be recognized early for what it is and not taken to be something else—appendicitis, or neurasthenia, or idiopathic pruritis vulvae, or idiopathic this or that.

Case of Situs Inversus Totalis

DISCLOSED BY THE PRESENCE OF THE VERMIFORM APPENDIX IN A LEFT INGUINAL HERNIAL SAC

MAURICE A. MICHAEL

VETERANS ADMINISTRATION HOSPITAL, LEBANON, PENNSYLVANIA

In 1938 the author[1] reported the unusual case of acute appendicitis in situs inversus totalis as a complication in a patient who was four months pregnant; appendectomy was followed by uneventful recovery.

Recently, a second case of complete situs inversus was operated on by the author, this time for a twice recurrent left inguinal hernia where the presence of the vermiform appendix (as well as part of the cecum as in a sliding hernia) in the hernial sac disclosed the existence of situs inversus which was not known preoperatively. Since the explanation of situs inversus, as well as a review of the literature, was presented in the first report referred to above, this phase of the subject will be omitted.

The usual contents of an inguinal hernial sac are small bowel and omentum; the presence of large bowel is unusual—if present, it is called a sliding hernia with the posterior wall of the sac covering the large bowel. The sigmoid (more freely movable) is found in left inguinal hernia much more frequently than in a cecal hernia on the right. Occasionally a cecal hernia occurs on the left when traction of the ileum already in the sac probably draws the cecum in also, or when a very long ascending colon permits the cecum to fall into the pelvis. The presence of the appendix in a hernial sac is of great importance since it may be the seat of inflammation, gangrene, etc. Although important, the presence of the vermiform appendix in a right inguinal hernia is not rare, but its occurrence as part of the contents of a left inguinal hernia is rare enough to warrant presentation of such a case.

The explanation referred to above of traction of the ileum in a left inguinal hernia pulling the cecum and appendix into the sac is a probability, but the existence of situs inversus must be kept in mind. Most cases of situs inversus reported in the literature were disclosed accidentally, usually by routine roentgen study of the chest where a dextrocardia suggested the possibility which was substantiated by barium enema studies. The cursory examination of the chest in most surgical emergencies, as well as in routine cases such as hernias, gives no clue to the existence of a dextrocardia. It is of real importance to the surgeon, as well as to the patient, to know that situs inversus is present.

The incidence has been variously reported. Sherk[2] in 1922 reported the occurrence of situs

Published with permission of the Chief Medical Director, Department of Medicine and Surgery, Veterans Administration, who assumes no responsibility for the opinions expressed or conclusions drawn by the author.

inversus 10 times in 347,000 cases at the Mayo Clinic over a ten-year period. Willis[3] in 1925 reported 3 cases in 10,000 admissions; from x-ray studies, LeWald[4] reported the incidence to be 1 in 1,400. Adams and Churchill[5] reported situs inversus occurred 23 times in 232,112 patients at the Massachusetts General Hospital or about 1 in 10,000. In 1944 Prescott and Zollinger[6] reported 3 cases among 15,347 admissions to an Army Station Hospital at Madison, Wisconsin.

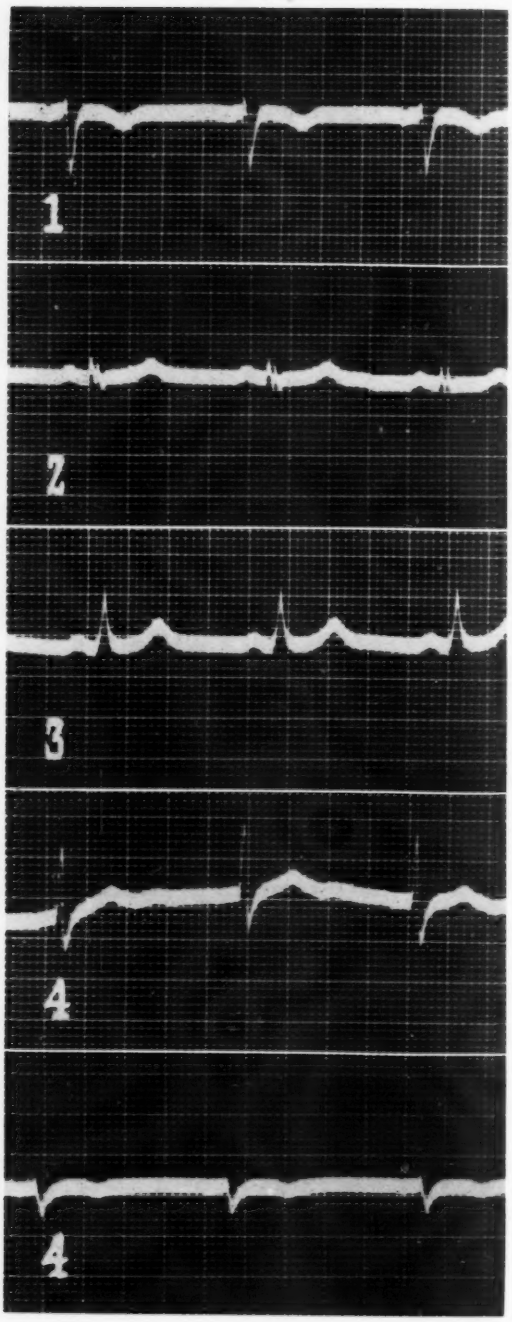
Haddon[7] reported a case of left-sided appendicitis where an appendectomy was done for an acute gangrenous appendicitis. The patient died on the fifth postoperative day and postmortem examination revealed the cecum to be in the left iliac fossa together with the sigmoid; the ascending colon went obliquely from the left iliac fossa to the right hepatic flexure, and the small bowel was entirely on the right side. No other transposition of viscera was present. Haddon has therefore suggested that the actual conditions resulted from failure of rotation of the midgut loop, which occurs at the tenth week of fetal life, allowing the cecum and colon to enter the abdominal cavity first instead of the normal midgut. This patient therefore does not present a picture of true situs inversus.

MAURICE A. MICHAEL

CASE REPORT

The patient, a white male, age 43 and married, was admitted to the surgical service of the Veterans Administration Hospital at Butler, Pa., for the repair of a twice-recurrent left inguinal hernia. This veteran had his first hernia repair performed in 1920 while in military service. A recurrence was noted in about three years, followed in a few years by the development of a right inguinal hernia. In 1936 an operation was performed, and a bilateral inguinal hernioplasty done. Within two months the patient noted some weakness in the left side, followed by a slight bulge. In 1939 he was hospitalized again and a diagnosis of recurrent left inguinal hernia was made, but at this time, he refused operation. This defect continued up to the present time and has steadily become larger. He has worn a truss for five years to support the left side. No recurrence exists on the right side. This patient is a truck driver, had one year of military service in 1920, is married and has two children living and well. He never had any unusual or serious illnesses or injuries.

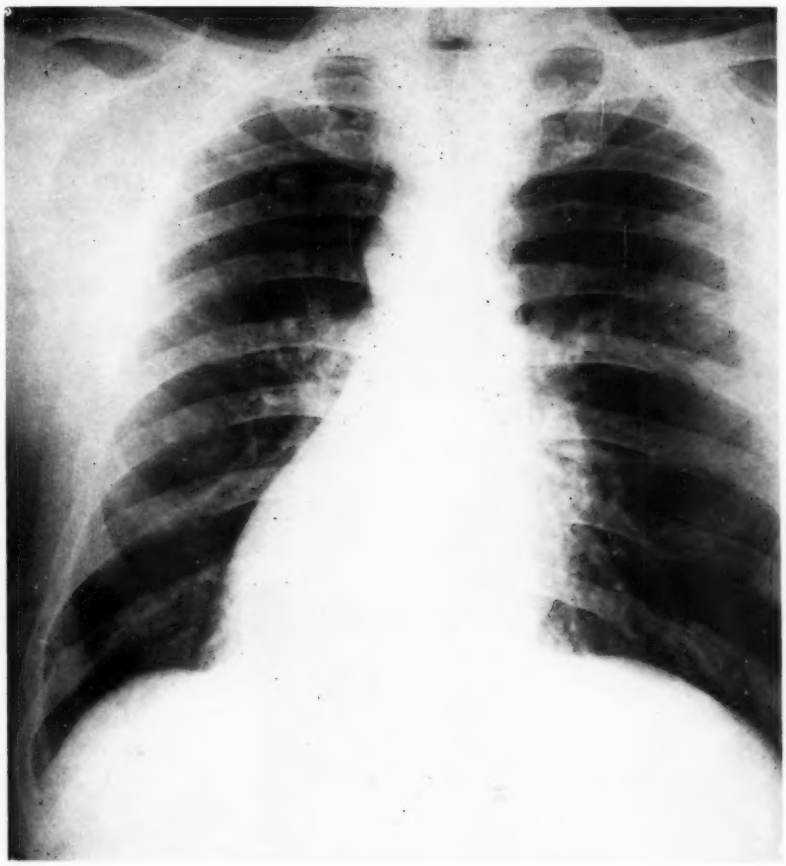
Physical examination revealed a well-developed, white, adult male who was not acutely ill; he wore a truss on the left side. Blood pressure was: systolic, 133; diastolic, 80. Head and neck were negative. Chest examination showed the heart sounds to be good and the lungs to be normal. There is a right inguinal incisional scar. Two inguinal incisional scars are present on the left, and a fairly large defect is noted on the left at about the level of the internal ring. Preoperative impression: recurrent left direct inguinal hernia. Urine, blood, and serology were essentially normal. Preoperative chest examination by anesthetist revealed no contraindication to surgery.



WITH the patient under spinal anesthesia, a left inguinal incision was made between the two incisional scars. The incision was carried down through the skin and subcutaneous tissue, and at its upper end, beyond the scar tissue, the external oblique aponeurosis was identified. By scissors' dissection, the external oblique aponeurosis was cleaned off laterally and down beyond the external ring. The incision was then made in the external oblique aponeurosis through the external ring; the spermatic cord was identified and mobilized on cord tape. Examination for indirect hernia was negative, but just below the level of the internal ring and mesial to the cord, a moderately large hernia was found in the transversalis fascia.

The hernial sac was opened by incising the transversalis fascia and peritoneum. Many omental adhesions attached to the inner portion of the sac were clamped, cut, and ligated. On the upper lateral portion of the sac was found the large bowel, which made up the posterior wall of the sac. Extending from this bowel was the vermiform appendix, thus making the large bowel cecum and the type of hernia a sliding one. The appendix was removed by the clamp and cautery method after ligation of the meso-appendix. No attempt was made to dislodge the adherent cecum from the sac, but the latter was closed with a continuous No. O chromic catgut suture, thus invaginating the sac. The transversalis fascia was then closed with interrupted No. 40 cotton sutures.

Figure 1. Electrocardiographic tracings: L1 shows complete inversion; L2 and L3 are transposed; $4F_1$ with precordial electrode on the left, shows complete inversion; $4F_2$ with precordial electrode on the right, over the actual apex, shows normal biphasic 4F tracing.



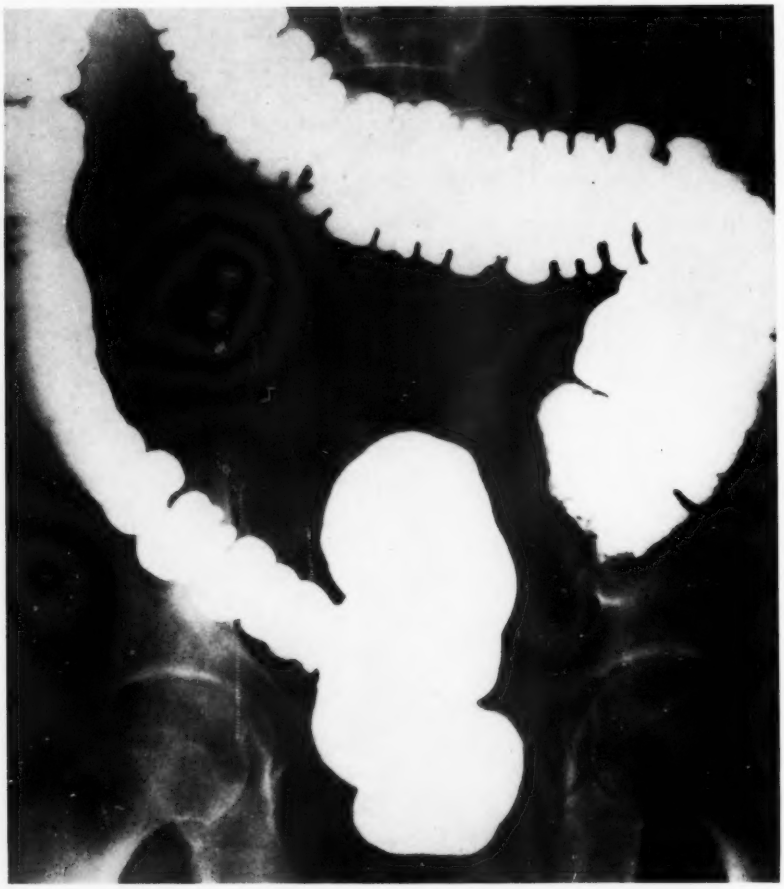
Right Left

Figure 2. X-ray of chest, showing the heart on the right side.

Final repair was made by bringing together the conjoined tendon to the shelving margin of Poupart's ligament, taking small bites through the transversalis fascia. The external oblique aponeurosis was imbricated beneath the cord as in a modified Andrew's hernioplasty. Scarpa's fascia and the skin were closed with interrupted cotton suture. The occurrence of the cecum and the appendix on the left strongly suggested the possibility of a situs inversus.

On the morning of the first postoperative day, percussion and auscultation of the chest revealed without any doubt the presence of a dextrocardia. On the second day the patient was permitted out of bed and allowed to take a few steps. He was placed on a full diet and by the third day was ambulatory.

On the fifth day, an electrocardiogram was taken, the tracing of which can be seen in Figure 1, which showed a complete reversal of a normal tracing. The conclusion of the cardiologist was that of a complete situs inversus. On the ninth day fluoroscopic examination of the chest further confirmed the fact of a dextrocardia, as did also the liver shadow on the left. X-rays taken after the ingestion of barium showed the cecum on the left and the



Right Left

Figure 3. Barium enema, disclosing sigmoid on the right, cecum on the left.

sigmoid on the right. (See Figures 2, 3 & 4). No doubt now remained as to the presence of a complete situs inversus in this patient. The patient made a complete and uneventful recovery and was discharged from the hospital on the fourteenth postoperative day.

This case presents a man 43 years old, who spent one year in the Army, and whose induction and discharge examination records noted no physical abnormalities. In addition, he was hospitalized twice (1936 and 1939), when records of examinations before or after operation mentioned no abnormality. In other words, three previous examinations failed to reveal the abnormality, and only when the pathology was brought out at operative table, was the true situation realized. Even though one might overlook dextrocardia on auscultation, such a case as his argues for more thorough examination before any operation. It should be stressed that when such a condition exists, the patient as well as the surgeon, and especially the latter, should know in case of any contemplated surgery.

Right Left

Figure 4. Ingestion of barium to show stomach on the right.

REFERENCES

1. Block, F. B., and Michael, M. A.: Appendicitis in complete transposition of viscera. Ann. Surg. 107: 511–16, April 1938.
2. Shefk, H. H.: Total transposition of viscera. Surg., Gynec. and Obst. 35: 53, 1922.
3. Willis, B. C.: Appendicitis and transposition of the viscera. Ann. Surg. 82: 256, 1925.
4. LeWald, L. T.: Complete transposition of the viscera. J. A. M. A. 84: 261, 1925.
5. Adams, R., and Churchill, E. D.: Situs inversus, sinusitis, bronchiectasis. J. Thoracic Surg. 7: 206, 1937.
6. Prescott, M. U., and Zollinger, R. W.: Situs inversus totalis. Am. J. Surg. 64: 288, May 1944.
7. Haddon, J. W. L.: Left sided appendicitis. Brit. M. J. 2: 569, Oct. 1945.

Acute Pancreatitis

MEDICAL AND SURGICAL MANAGEMENT

A scientific exhibit from Thomas A. Shallow, M.D., Sherman A. Eger, M.D., and Frederick B. Wagner, Jr., M.D., of the Jefferson Medical College Hospital, Philadelphia.

INTRODUCTION

Until recently, acute pancreatitis has been considered to be of extreme rarity, difficult diagnosis, and high mortality. It is the purpose of this exhibit to emphasize the advances which have increased its recognition, rendered its diagnosis more certain, and greatly reduced its mortality. In addition, 50 consecutive cases encountered in the Jefferson Medical College Hospital during the past six years are analyzed, since they represent a typical group and illustrate well the associated lesions, the varying clinical manifestations, and the complications of this disease.

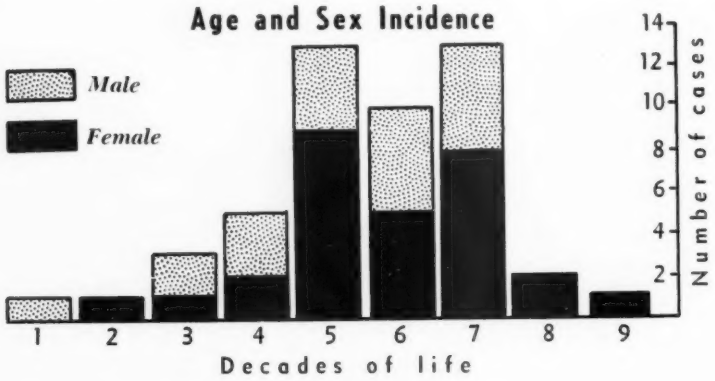
INCIDENCE

AGE

1. Acute pancreatitis is usually a disease of middle and late life.
2. The average age for the 50 cases was 50 years.
3. The age extremes were 8 to 85 years.

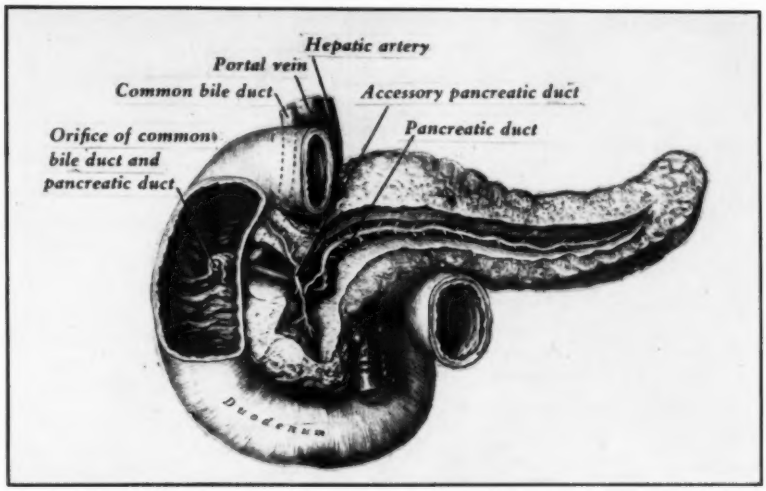
SEX

1. The disease is more common in females.
2. In the 50 cases 60 per cent were females and 40 per cent males.



COLOR

1. The disease is rare in the colored race.
2. Only one colored patient was encountered in the present series.



The pancreas and its ducts (Gray).

ETIOLOGY

I. Noninfectious Origin (Usual Primary Causes)

A. MECHANICAL OR OBSTRUCTIVE
1. Stone in common duct or ampulla of Vater
2. Stone in pancreatic duct
3. Spasm of sphincter of Oddi
4. Edematous occlusion of ampulla of Vater
5. Epithelial metaplasia in pancreatic duct

B. CHEMICAL
Activated pancreatic ferments resulting from
1. Reflux of bile
2. Reflux of duodenal contents
3. Autolysis

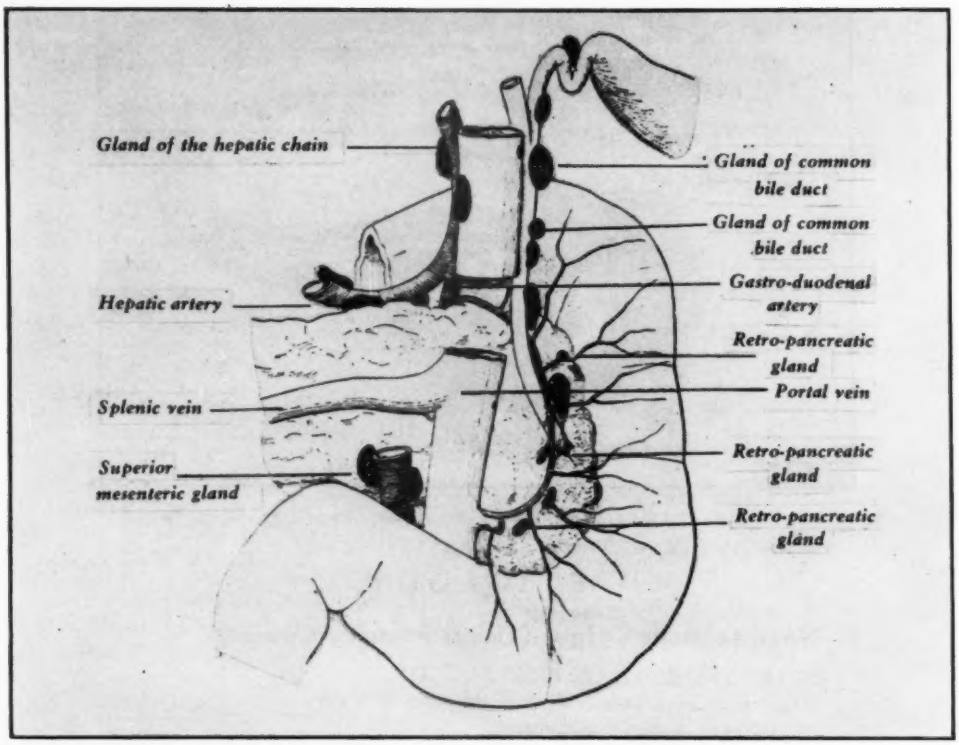
C. DEGENERATIVE CHANGES IN THE PANCREAS
1. Changes secondary to benign or malignant tumors
2. Changes from vascular degeneration or hemorrhage

D. TRAUMA
1. Nonpenetrating abdominal injury
2. Penetrating abdominal injury
3. Surgical operative injury

II. Infectious Origin (Usual Secondary Causes. Rarely Primary)

A. Invasion of pancreas along the lymphatics
B. Invasion of pancreas from the blood stream
C. Infection by extension along pancreatic ducts from the duodenum or the bile ducts
D. Infection by direct extension from adjacent infected foci
E. Infection following activation of bacteria in the pancreas itself

III. Combinations of Factors in I and II



Posterior surface of duodenum and pancreas, showing relation of lymph nodes along the hepatic artery, cystic and common bile duct chains to those corresponding to the vascular arch behind the pancreas (Poirier, Cuneo, and Delamere).

PATHOLOGIC TYPES

I. Edematous (Acute Interstitial Pancreatitis)

This is the common form and fortunately the milder.

Grossly the pancreas is swollen, hard, and contains small areas of fat necrosis.

Microscopically there is edema and many polymorphonuclear cells in the interstitial tissue of the acini and lobules.

Subsidence of the inflammation is accompanied by fibrosis.

II. Hemorrhagic (Acute Pancreatic Necrosis)

This is the less common but severe form.

Grossly the pancreas is enlarged, soft, and friable, and may be black and gangrenous. Areas of fat necrosis are abundant, found not only over the pancreas, but also in the mesentery, omentum, subperitoneal fat of the abdominal wall, and even in the mediastinum and pericardium (see illustration). There is blood tinged fluid in the peritoneal cavity.

Microscopically within the pancreas there is a diffuse necrosis with extensive infiltration of polymorphonuclear cells. These necrotic areas may be absorbed and replaced by fibrous tissue or may become infected, resulting in abscess formation. Much of the pancreas may slough away.

Blood-tinged fluid and pancreatic enzymes in the lesser peritoneal cavity may become walled off by fibrous tissue, thus forming the so-called "pseudocyst."

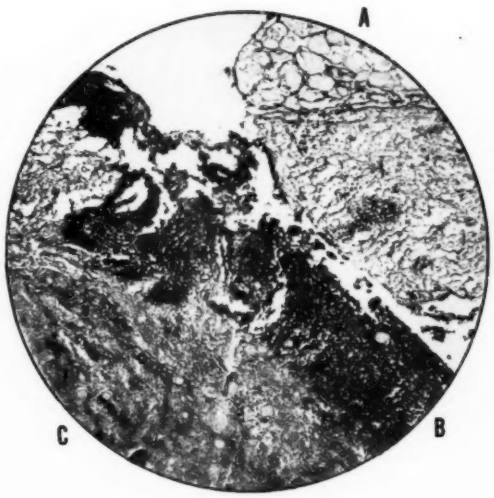
PATHOGENESIS

DAMAGE WITHIN PANCREAS (AUTODIGESTION)

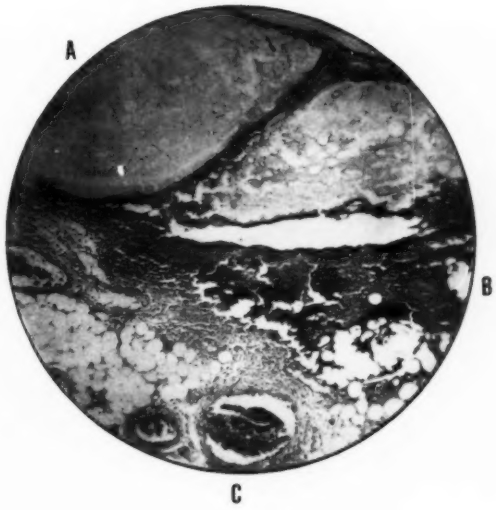
1. **Trypsin digests Tissue Protein** → Necrosis; Erosion of blood vessels (hemorrhage); Split protein products → Suppuration may follow
2. **Lipase digests Tissue Fat** → Glycerol (absorbed); Fatty acids + Calcium ions → Calcium soaps (Whitish plaques)
3. **Amylase** → Absorbed

DAMAGE OUTSIDE PANCREAS (VIA BLOOD AND LYMPH STREAM)

1. Trypsin and Split Protein Products	2. Lipase	3. Amylase
↓	↓	↓
Shock Death	Fat Necrosis in Abdomen and Thorax	Excreted in Urine



Photomicrograph of slough of tail of pancreas, showing an island of fat necrosis (A); a dense zone of nuclear fragments, polymorphonuclear leukocytes and a few eosinophiles (B); and a zone of unidentifiable necrotic tissue (C).



Photomicrograph of section of great omentum, showing extensive fat necrosis (A); a zone of polymorphonuclear leukocytes and nuclear fragments (B); and a zone containing dilated blood vessels (C).

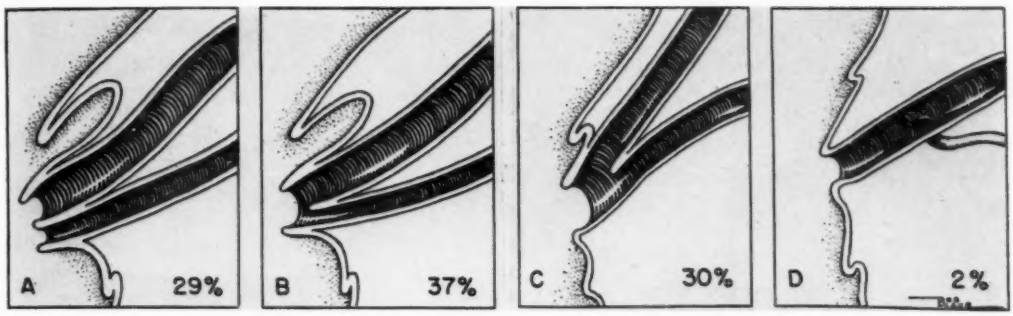
SYMPTOMS AND SIGNS

The symptoms and signs of acute pancreatitis vary considerably, according to the degree of inflammation and the portion of gland involved.

1. EDEMATOUS TYPE (Common, Mild, Subsides within 24-48 Hours)
   a. Pain, mild to moderate, usually epigastric, but may radiate to any portion of abdomen or lower chest.
   b. Nausea and vomiting may occur.
   c. Tenderness over pancreas.
   d. Jaundice may occur from common duct obstruction or hepatitis.
   e. Temperature and pulse rate moderately elevated.

2. HEMORRHAGIC TYPE (Uncommon, Severe, Duration 5-10 Days)
   a. Pain, usually severe, with radiation to any portion of abdomen or lower chest.
   b. Nausea and vomiting usually present.
   c. Tenderness, rebound tenderness, and rigidity over pancreas and adjacent abdomen.
   d. Distention due to toxic ileus.
   e. Cyanosis and shock may occur.
   f. Jaundice may result from common duct obstruction or hepatitis.
   g. Temperature and pulse rate markedly elevated.

Postmortem specimens, showing fat necrosis of omentum and pericardium, pancreatic hemorrhage, and two large gallstones.



Relational anatomy of the common bile and pancreatic ducts as they enter the duodenum (Rienhoff and Pickrell).

DIAGNOSIS

1. Acute pancreatitis should be included as a diagnostic possibility in all patients with upper abdominal pain.

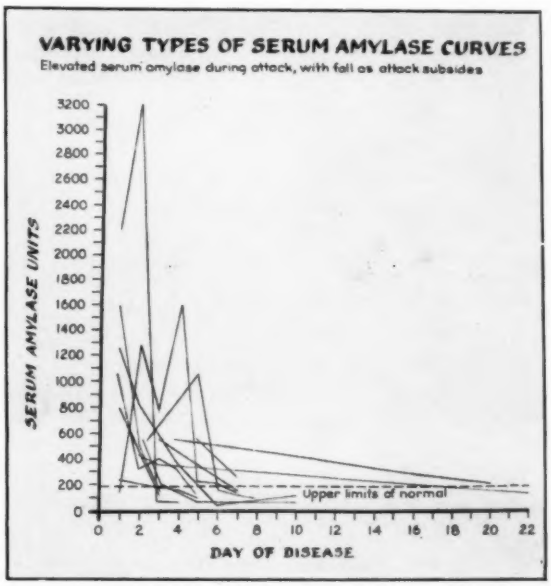
2. The diagnosis cannot be established with certainty from the symptoms and signs alone.

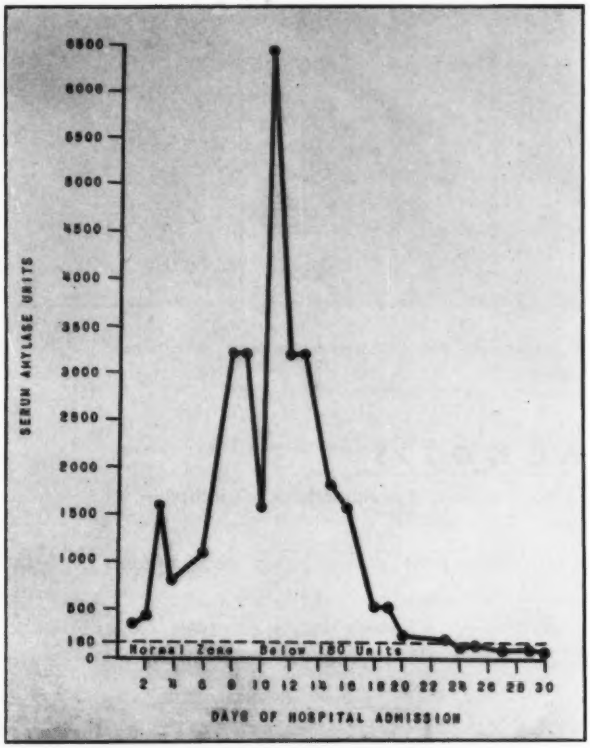
3. The serum amylase test confirms the diagnosis during the acute phase of the disease. This test is practically specific for acute pancreatitis and seldom, if ever, presents false positives.

DIFFERENTIAL DIAGNOSIS

Acute pancreatitis *must be differentiated from*

1. *Surgical Conditions,* such as
   a. Ruptured Peptic Ulcer
   b. Acute Cholecystitis
   c. Acute Intestinal Obstruction
   d. Biliary or Renal Colic
   e. Appendicitis or Meckel's Diverticulitis
   f. Mesenteric Thrombosis
2. *Medical Conditions,* such as
   a. Coronary Artery Disease
   b. Pneumonia
   c. Tabetic Crisis





Serum Amylase Readings in Unusual Case of Traumatic Pancreatitis: male; aged nine years; abdominal pain following non-penetrating trauma to upper abdomen; admission to hospital 9 days later when pain became acute; recovery without operation.

SERUM AMYLASE TEST

I. Normal Variations

a. *Normally,* amylase is present in the blood stream at fairly constant levels. The origin of this amylase is at present unknown.

b. *Amylase in the blood* is completely absent at birth. It first appears at two months, is measurable at three months, and reaches the adult value at one year. Thereafter it is not influenced by age, sex, amount or type of food, fasting, dehydration, diuresis, exercise, or sleep.

c. *Among healthy ambulatory adults,* 80 per cent have levels between 80 and 150 units (Somogyi), while the remaining 20 per cent have a low range of 60 to 80 units or a high range of 150 to 180 units.

II. Abnormal Variations

a. *Values above 200 units* or below 60 units are considered abnormal.

b. *Serum amylase activity rises sharply* at the onset of an attack of acute pancreatitis and may subside just as sharply within 48 to 72 hours. Levels as high as several thousand units are not unusual.

c. *Moderate or marked elevation* of the serum amylase rules strongly in favor of acute pancreatitis. A normal serum amylase report does not rule out acute pancreatitis.

d. *In doubtful cases* serial serum amylase determinations should be made at least daily. In all instances careful correlation of serum amylase values must be made with the history and physical findings.

e. *Elevated serum amylase* may occur in conditions other than acute pancreatitis, such as acute parotitis, pneumonia, renal insufficiency, hyperthyroidism, and obstruction of abdominal venous or lymphatic return.
f. *Decreased serum amylase* may occur in diseases associated with marked liver damage or debilitation, such as obstructive jaundice, pernicious anemia, diabetes mellitus and tuberculosis.

III. Technic of Test

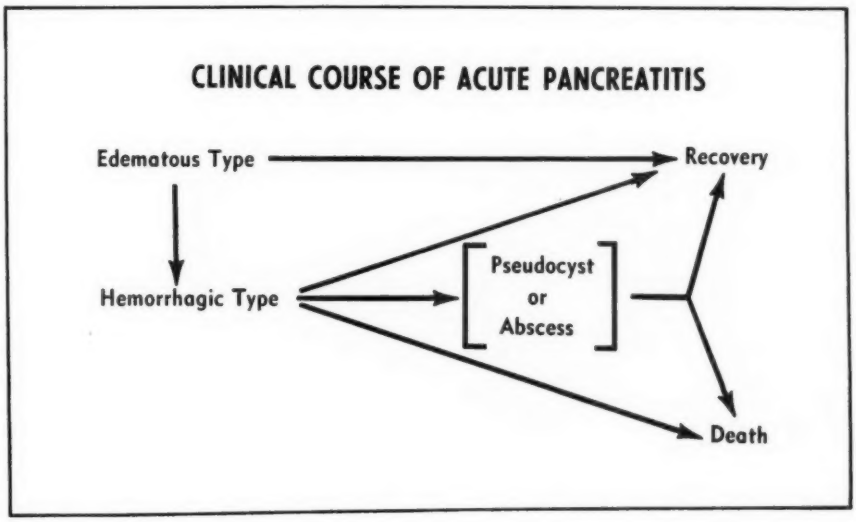
a. 4 cc. starch solution (75 mg. starch and 250 mg. sodium chloride per 100 cc.) in test tube.
b. Immerse in constant temperature water bath at 40° C.
c. After several minutes add 1 cc. of patient's serum or plasma.
d. Mix immediately. Time incubation from this point.
e. After 5 to 6 minutes of incubation, 0.5 cc. portions of the mixture are withdrawn at intervals and introduced into test tubes (diameter 7 mm.) containing 0.5 cc. portions of the iodine solution (0.002 N. aqueous iodine solution containing 2 per cent potassium iodide). The test tubes are examined for color. The end point is the point at which red brown color of the erythrodextrin is seen with barely a perceptible tinge of purple. The exact time of incubation to produce this result is reported.

Calculations:

$$\textit{Amylase} \text{ equals } \frac{K}{V \times T}$$

where K equals *constant factor* (1600)
T equals *exact time of incubation* (min.)
V equals *exact volume of serum used* (cc.)

When the amylase activity of the blood is abnormally high, as in acute pancreatitis, the color given with iodine will be far past the end point at the 5 minute test. In such instances the determination is repeated with diluted plasma. Dilutions of 1:2 to 1:15 may be necessary. For dilution of the serum 0.5 per cent sodium chloride is used. If a 1:4 dilution is used, and 1 cc. of this dilution is used in the test, then V equals 0.25, as actually only 0.25 cc. of serum is used.



LABORATORY FINDINGS OTHER THAN ELEVATED SERUM AMYLASE

1. **Leukocytosis**
   Leukocytosis is usually present in acute pancreatitis, but is more marked in the hemorrhagic type (15,000-30,000). Early the serum amylase may be elevated before the leukocytic response occurs, whereas the leukocytosis may persist for several days after the serum amylase values have fallen to normal.
2. **Albuminuria**
   This is present in varying degrees in practically all cases. It is probably due to an irritant effect of the circulating toxic products upon the renal glomerular membrane or the tubular epithelium.
3. **Hyperbilirubinemia**
   Latent to manifest jaundice is frequently present. This is probably due in most instances to edema in the head of the pancreas with resultant compression of the common duct in its transit through the gland, but the presence of a stone in the common duct or associated hepatitis may play a role in some cases.
4. **Hypoprothrombinemia**
   In the majority of cases the prothrombin time is 60% or less. This is probably due to associated liver damage, toxic in origin.
5. **Bromsulfalein Dye Retention**
   Mild degrees of dye retention, as shown by this liver function test, are further evidence of the associated liver damage, toxic in origin.
6. **Hypoproteinemia**
   The serum protein level is more apt to be lowered in the hemorrhagic type. We advocate this as an important study in acute pancreatitis, since its correction is essential in tissue repair.
7. **Hypocalcemia**
   According to the recent work of Edmondson and Berne, serum calcium findings below 9 mg. per 100 cc. of blood usually occur in cases of pancreatic necrosis some time between the 2nd and 15th day of the disease, and values below 7 mg. indicate a fatal prognosis.

Photomicrograph of wall of pseudocyst, composed entirely of dense fibrous tissue. Note absence of lining membrane.

TREATMENT

Acute pancreatitis is not an operative emergency, but is primarily a medical problem. Operation is indicated later, if complications such as pseudocyst or abscess arise, or if there is a contributing lesion such as biliary tract disease.

Medical Management

Rationale:

1. To lessen pancreatic activity.
2. To combat toxicity, infection, and shock.
3. To prevent or minimize complications.

Methods employed:

1. Withholding food by mouth, thus eliminating a stimulus to pancreatic secretion.
2. Wangensteen suction to combat ileus.
3. Intravenous administration of saline solution, glucose, blood, or plasma, amino acids, and vitamins (B complex, C, and K).
4. Chemotherapy (antibiotics and sulfonamides) to combat infection.
5. Oxygen in severe cases.

Results:

Within 48 hours the edematous type of pancreatitis usually subsides and the hemorrhagic type may improve. Failure to improve indicates the hemorrhagic type in which the development of pseudocyst or abscess should be strongly suspected.

Surgical Management

Indications for Operation:

1. *During the acute attack,* when the patient becomes progressively worse, despite medical treatment. Here, undue delay may prove disastrous.

Rationale:

(a) To permit drainage of products of pancreatic digestion, either infected or non-infected, from the lesser peritoneal cavity.
(b) To decompress the biliary system by cholecystostomy or choledochostomy when it is under increased tension, but more radical surgery such as cholecystectomy should be deferred to a later date.

2. *After the acute attack has subsided,* for correction of any contributing lesion which subsequent studies have revealed. Here, the procedure is elective.

Rationale:

(a) To aid in preventing subsequent attacks of acute pancreatitis.
(b) To correct the contributing lesion itself (usually biliary tract disease).

Procedure When Patient Is Operated Upon Because of Mistaken Diagnosis

When acute pancreatitis is encountered unexpectedly at laparotomy, then the most conservative surgical procedure aimed at correction of some obvious etiologic factor, if one presents, as for example biliary tract disease, is the best. A drain inserted to the capsule of the pancreas through the gastrohepatic or gastrocolic omentum, and biliary drainage only when definite indication exists, usually suffices.

TREATMENT EMPLOYED IN EXHIBITORS' SERIES OF 50 CASES

Edematous Type (36 Cases)

- Medical Treatment Only 11
- Operated Cases 25
- Operative Procedures:
  - (All were delayed until acute phase subsided)
  - Cholecystectomy 18
    - Alone 8
    - With Appendectomy 3
    - With T-Tube Drainage 3
    - With T-Tube Drainage and Appendectomy 4
  - Cholecystostomy 2
  - T-Tube Drainage Alone 1
  - Cholecystojejunostomy 4

Hemorrhagic Type (14 Cases)

- Medical Treatment Only 4
- Operated Cases 10
- Operative Procedures:
  - *Immediate Operations* 5
    - (Performed during acute phase because of mistaken diagnosis for: Ruptured Peptic Ulcer, Acute Intestinal Obstruction, and Strangulated Epigastric Hernia.)
    - Exploratory Laparotomy 3
    - Drainage of Lesser Peritoneal Cavity 2
      - Alone 1
      - With Cholecystostomy 1
  - *Delayed Operations* 5
    - Drainage of Pseudocyst 2
      - In Transverse Mesocolon 1
      - Between Stomach and Transverse Colon (Marsupialization) 1
    - Drainage of Pancreatic Abscess 2
      - With Cholecystostomy 1
      - With Drainage of Liver Abscess 1
    - Exploratory Laparotomy 1

Cholangiogram in patient who had acute hemorrhagic pancreatitis, showing reflux of radiopaque medium into pancreatic duct.

Plain roentgenogram, showing toxic ileus in patient with acute hemorrhagic pancreatitis.

ASSOCIATED BILIARY TRACT DISEASE (68%)

In Edematous Type

Present in 27 out of 36 cases (75%)

Acute Calculous Cholecystitis	5
Acute Non-Calculous Cholecystitis	1
Empyema with Calculi	1
Chronic Calculous Cholecystitis	6
Chronic Non-Calculous Cholecystitis	6
Hydrops with Calculi	2
Common Duct Stone	1
Diagnosis on History Alone	5

In Hemorrhagic Type

Present in 7 out of 14 cases (50%)

Acute Non-Calculous Cholecystitis	1
Chronic Non-Calculous Cholecystitis	1
Chronic Calculous Cholecystitis	1
Diagnosis on History Alone	4

OTHER ASSOCIATED DISEASES (12%)

In Edematous Type

Present in 6 out of 36 cases (17%)

Carcinoma of Head of Pancreas	3
Perforating Posterior Peptic Ulcer	2
Duodenal Diverticulum	1

In Hemorrhagic Type

None

Plain roentgenogram, showing large soft tissue mass (pancreatic pseudocyst) in left upper abdominal quadrant.

Roentgenologic upper gastrointestinal study with barium, showing displacement of the stomach and extrinsic pressure on the greater curvature.

Normal position and contour of stomach restored following marsupialization of pancreatic pseudocyst.

Postoperative barium enema, showing splenic flexure restored to normal position.

COMPLICATIONS

During a severe attack of acute pancreatitis, enzymes and products of pancreatic necrosis may accumulate within the lesser peritoneal cavity, and by their irritating effect become walled off by an inflammatory reaction, forming the so-called *pseudocyst*. *Abscess formation* results when bacteria infect the pancreas itself, or any accumulated fluid and tissue debris within the lesser peritoneal cavity, or even adjacent structures such as liver or mesentery.

Complications Encountered in Exhibitors' Series Pseudocyst Formation	4 Cases
Between Stomach and Liver	1
Between Stomach and Transverse Colon	1
In Transverse Mesocolon	1
Early Pseudocyst in Lesser Sac	1
Abscess Formation	2 Cases
Pancreas Alone	1
Pancreas and Liver	1

MORTALITY

There were 3 deaths in this series (6 per cent).

Two patients had far advanced carcinoma of the pancreas with severe jaundice and edematous pancreatitis; they died following cholecystojejunostomy.

One patient had fulminating pancreatitis, became progressively worse, and died within one week without surgical intervention. Postmortem examination revealed acute hemorrhagic pancreatitis with early pseudocyst in the lesser sac; fat necrosis of visceral and parietal peritoneum, pericardium, and left pleura; and pulmonary edema.

Preoperative barium enema, showing displacement of splenic flexure of colon to level of left iliac crest by pancreatic pseudocyst.

Pancreatic pseudocyst producing filling defect along lesser curvature of stomach.

CONCLUSIONS

1. The reliability of the serum amylase test in diagnosis during the acute phase of pancreatitis has become firmly established.

2. Whenever the diagnosis is questionable in a patient with acute upper abdominal pain, a serum amylase test should be performed.

3. Proper management of acute pancreatitis is dependent upon accurate diagnosis.

4. We believe that if the clinical picture of acute pancreatitis is substantiated by an elevated serum amylase, one is justified in delaying operation and in some cases not operating at all.

5. Delay in operating, with conservative measures directed toward combating toxicity, altered blood chemistry, and infection, has markedly decreased the mortality in acute pancreatitis.

6. Operation is indicated during the acute phase only if the patient becomes progressively worse despite supportive therapy. The surgical procedure employed should be as conservative as possible, consisting of drainage of the lesser peritoneal cavity, and, if necessary, decompression of the biliary tract.

7. Operation is indicated after acute phase, if it is necessary to correct contributing lesions, usually biliary tract disease.

EDITORIALS

CARCINOMA OF THE BREAST

THE June issue of *Annals of Surgery* included three interesting papers on carcinoma of the breast, which had been read at the 58th Annual Session of the Southern Surgical Association.

Finney and his associates discussed results of their operation on 298 consecutive patients, over a period of fifteen years. Four surgeons performed the operations, which included 281 radical mastectomies and 17 simple mastectomies. Only 19 received either pre- or post-operative radiation; hormonal therapy had been used in 3 of the group. Operative mortality was 1 per cent. After three years, the survival rate was 77 per cent; 49 per cent after five years; 19 per cent after ten years; and 4 per cent after fifteen years. One hundred-fifty of the group did not die of cancer metastases; of these, 70 per cent showed no metastatic lesions in their axillary nodes at the time of operation. The authors believe that for a good prognosis, radical operation must be done before metastatis has occurred in the axillary nodes.

A series of 238 patients was studied by Marshall and Hare, who found that radical surgical removal of breast carcinoma, followed by intensive radiation treatment, yielded improved clinical results and prolonged life. After five years or longer, 52 per cent of their patients were still alive, and showed no evidence of recurrent tumor. Further, local recurrent tumors appeared in only 8 per cent of their patients. Marshall and Hare agree with the previous authors, in stating that failures, in many cases at least, result from spread of the disease to distant areas, prior to beginning treatment.

Horsley, on the basis of sound rationale, combined radical amputation of the breast with bilateral oophorectomy, in premenopausal patients. While his series was small, consisting of only 26 patients who had been operated for three years or more, his results do appear remarkable. In both his three- and five-year post-operative groups 76.9 per cent of the patients were living and had suffered no recurrences. He compared these results with those obtained in 62 patients who had been operated, without oophorectomy, and who likewise had had no recurrences within five years. This latter group consisted of only 43.5 per cent of the operated patients. Hence, the author justly recommends the combined operative procedure.

BIRTH, DEATH, AND LIFE SPAN

THE Statistical Bulletin of the Metropolitan Life Insurance Company predicts that more babies will be born this year, in the United States, than ever before. The 1947 number should exceed the 3,440,000 mark set last year, thereby establishing a new record. Forty per cent more babies were born during the first five months of 1947 than during the like period of 1946. As the year progresses, this large difference will be whittled down, but not enough to keep this year from being a record year. In addition, the statisticians believe that 1947 will hold the record for some years to come, because the marriage rate dropped appreciably during the first five months of the current year.

Another factor bearing upon this question, is the accelerated divorce rate in this country. The increase in the number of divorces granted

between 1942 and 1946 nearly equalled the increase from the beginning of our history until the year 1942.

While 1947 is the bumper year for babies, it will also probably set a record for longevity and low mortality. During the past decade the life expectation of American wage earners and their families has increased by five years; life expectation among this group is ten years greater now than in 1926. At present it has passed the sixty-five year mark.

A new low in mortality will doubtless be reached this year, barring some unforeseen development. Improvement in mortality is evident in virtually every age period. During the first six months of this year the rate was 7.6 per 1,000 Metropolitan policy holders, which is 3.8 per cent lower than that for a like period of 1946.

Fewer deaths are caused by infectious diseases such as pneumonia, tuberculosis, and syphilis. The principal communicable diseases of childhood have new minimum rates. Diabetes and cardiovascular-renal diseases have favorable rates this year. Cancer alone registers an increased mortality.

HYDATIDIFORM MOLE

Conventional laboratory tests for pregnancy have never successfully differentiated normal pregnancy from hydatidiform mole. This diagnostic failure often leads to serious complications. Consequently, the announcement of Weisman and Coates is of interest, for these investigators were able to differentiate the two conditions by a single quantitative assay of the gonadotropic hormone in the urine.

Their experimental animal was the South African "frog," *Xenopus laevis,* which, incidentally, is not a true frog at all, but merely resembles one. When the female of this species is injected with pregnancy urine, it lays eggs in abundance. If the patient's urine does not contain gonadotropic hormone, as in pregnancy, the frog lays no eggs.

Chorionic tumors (hydatidiform mole) are usually associated with tremendous outpourings of gonadotropic hormone in the urine. Generally, in the patients with these tumors the amount of hormone found in the urine is as much as a hundred or even a thousand times as great as that found in a normal pregnancy. On the basis of this well-known fact, Weisman and Coates developed their test.

Frogs must be injected with undiluted, or even concentrated normal pregnancy urine in order for them to lay eggs. If normal pregnancy urine is diluted 1:10 it rarely if ever contains sufficient hormone to cause egg-laying response. But the urine of patients with hydatidiform mole contains such quantities of hormone that even in dilution of 1:100, the frogs can be made to lay eggs.

Three frogs, then, were injected with suspected urine, in undiluted strength, in dilution of 1:10, and in dilution of 1:100, respectively. If only the frog injected with undiluted urine laid eggs, normal pregnancy was implied. If the frog injected with urine diluted 1:10 also laid eggs, the probability of a tumor could not be dismissed. If all three frogs laid eggs, the presence of a far-advanced chorionic tumor was almost a certainty. Except in the very rare normal pregnancies in which tremendous amounts of hormone are excreted, this test will yield a valuable diagnosis.

Weisman and Coates tested 31 patients, 6 of whom were diagnosed as having chorionic tumors. Clinical studies substantiated the diagnoses. Of the remaining 25 patients who gave no response with diluted urines, 1 was found at laparotomy to have a large ovarian cyst; the remainder were normal pregnancies.

RADIOACTIVE PHOSPHORUS

Regardless of obvious and distinct clinical limitations, roentgen radiation has for years been the most effective palliative treatment of chronic leukemic states and allied hematologic dyscrasias. Radium and other naturally occurring radioactive elements also have been used, but, of necessity, applied externally.

With the development of the cyclotron, however, isotopes have been made available which permit internal radiation therapy. Of these, radioactive phosphorus, P^{32}, has received most extensive study. Doan and his associates at the Medical School of Ohio State University recently have published their results of a six-year clinical evaluation of P^{32} as a therapeutic agent in blood dyscrasias.

The therapeutic value of P^{32} is dependent upon the fact that phosphorus is selectively deposited in bone and in the nuclei of rapidly multiplying cells. However, the radioactive and the nonradioactive isotopes of phosphorus are chemically identical. Hence the radioactive material is so situated that the beta-rays may exert their maximum inhibitory and destructive effects upon adjacent marrow elements.

Diseases treated with P^{32} included polycythemia rubra vera, various leukemias, Hodgkin's syndrome, metastatic carcinoma and sarcoma, multiple myeloma, mycosis fungoides, and exfoliative dermatitis. Altogether, one hundred patients were included in the series. Administration of the drug, in more recent months, has been confined to the oral route.

P^{32} was found to be of greatest value in controlling the clinical and hematologic manifestations of polycythemia rubra vera. It has an adjunctive value in some chronic leukemic states, particularly in patients who are intolerant or resistant to roentgen radiation.

The acute leukemias, in general, do not respond favorably to P^{32} treatment; nor has the drug proven effective, and may even be dangerous, in Hodgkin's syndrome. Although metastatic malignancies of the bone may or may not be specifically retarded, the deep bone pain may be relieved by P^{32}. In some cases pruritis secondary to leukemia cutis, polycythemia rubra vera, and exfoliative dermatitis has been effectively controlled.

Doan and his associates emphasize that the efficacy of therapy depends upon "selective" cell destruction. Doses of P^{32} should be well-spaced, small, and adequately controlled with frequent and complete blood and bone marrow studies.

INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA

OFFICERS OF THE ASSOCIATION

PRESIDENT
Dr. James E. Paullin, Atlanta, Ga.

PRESIDENT-ELECT
Dr. Herman L. Kretschmer, Chicago, Ill.

PRESIDENTS OF CLINICS
Dr. John F. Erdmann, New York, N. Y.
Dr. Frank H. Lahey, Boston, Mass.

MANAGING DIRECTOR
Dr. Arthur G. Sullivan, Madison, Wis.

SECRETARY
Dr. Tom B. Throckmorton, Des Moines, Ia.

TREASURER AND DIRECTOR OF FOUNDATION FUND
Dr. Henry G. Langworthy, Dubuque, Ia.

SPEAKER OF THE ASSEMBLY
Dr. Mather Pfeiffenberger, Alton, Ill.

BOARD OF TRUSTEES
Dr. Edwin S. Hamilton, Kankakee, Ill.
Dr. Mather Pfeiffenberger, Alton, Ill.
Dr. Maurice R. Williamson, Alton, Ill.
Dr. Henry G. Langworthy, Dubuque, Ia.
Dr. John E. O'Keefe, Waterloo, Ia.
Dr. Tom B. Throckmorton, Des Moines, Ia.
Dr. George V. I. Brown, Milwaukee, Wis.
Dr. John M. Dodd, Ashland, Wis.
Dr. Eugene S. Sullivan, Madison, Wis.

COMMITTEE ON MEDICAL RESEARCH AND ADVANCEMENT
Dr. Elliott P. Joslin, Boston, Mass.
Dr. W. Wayne Babcock, Philadelphia, Pa.
Dr. Charles H. Best, Toronto, Ont.
Dr. George Crile, Jr., Cleveland, Ohio.
Dr. Evarts A. Graham, St. Louis, Mo.
Dr. Roy D. McClure, Detroit, Mich.
Dr. Jonathan C. Meakins, Montreal, Quebec.
Dr. Eric Oldberg, Chicago, Ill.
Dr. James E. Paullin, Altanta, Ga.
Dr. Erwin Schmidt, Madison, Wis.
Dr. Waltman Walters, Rochester, Minn.

PROGRAM COMMITTEE
Dr. Russell L. Cecil, New York, N. Y.
Dr. Henry A. Christian, Boston, Mass.
Dr. John R. Fraser, Montreal, Quebec.
Dr. Duncan A. L. Graham, Toronto, Ont.
Dr. Herman L. Kretschmer, Chicago, Ill.
Dr. Frank H. Lahey, Boston, Mass.
Dr. Charles F. Martin, Montreal, Quebec.
Dr. Charles W. Mayo, Rochester, Minn.
Dr. Howard C. Naffziger, San Francisco, Cal.
Dr. Charles H. Phifer, Chicago, Ill.
Dr. Leonard G. Rowntree, Philadelphia, Pa.

This Month in Medicine

SEROLOGIC SYPHILIS REACTIONS

PERSISTENT non-specific, false-positive reactions to serologic tests for syphilis are always confusing, and have elicited numerous explanations. At least one investigator has suggested that there might be such a thing as hereditary false-positive reactiveness, determined by gene action and transmitted from parent to offspring in much the same manner as the blood groups. This, indeed, appears to be the finding of Singer and Boerner, who studied an Italian family, most of whose members consistently gave false-positive flocculation tests when tested for syphilis.

Most false-positive reactions disappear after a few days or weeks, for frequently they are engendered by inflammatory processes, immunizations, etc. In the case of this family, however, false-positive reactions have endured for a space of two years, although none of the family gives any history or evidence of syphilis. Complement fixation reactions are consistently negative.

The father's serum is negative to the flocculation test for syphilis. The mother's serum is positive. Sera of three of the children are positive; serum of the fourth child, Jean, is negative. The father is blood group O, and the mother is group A. The three children who give positive flocculation tests are group A, while Jean, the flocculation-negative reactor, is group O.

These data, admittedly very scanty, suggest that the factor that determines non-specific reactivity of the serum might be hereditary and transmitted in the same way as the blood groups; indeed, in this case, it might be carried on the same chromosome as the gene for blood group A. Many more data, of course, are essential.

SUGGESTED READING

Singer, A. G., and Boerner, F.: Persistent familial (non-specific) serologic flocculation reactions for syphilis suggesting an hereditary mechanism. Am. J. M. Sc. 214:89 (July) 1947.

BAL AND ARSENICAL DERMATITIS

BAL (British Anti-Lewisite) has been referred to as the answer to the syphilologist's prayer. Well it might be, for through the judicious use of this compound, syphilitics may now be relieved of their arsenical dermatitis in a matter of a few days. They may be treated as out-patients. No longer need they be confined to the hospital for weeks at a time.

Reeve recently reported his successful treatment of two patients suffering from erythematous rashes with desquamation, which had been brought on by arsenical administration. The conventional treatments brought no relief. BAL therapy was then started: 2 ml. was introduced intramuscularly every four hours, the first day; followed by 2 ml. twice a day for three days; then 2 ml. a day for two days. Response was dramatic. The rash began to clear as soon as treatment was started.

SUGGESTED READING

Reeve, J. L.: Arsenical dermatitis successfully treated with BAL. Brit. M. J. 2:132 (July 26) 1947.

BLOOD-BANKS AND SYPHILIS

ONE of the more important precautionary problems involved in a blood-bank program is the prevention of transfusion syphilis. Numerous investigations have been conducted to determine the virulence of *Treponema pallidum* under conditions which obtain in blood-banks and in processed blood products.

Turner and his associates have been most assiduous students of the problems involved, and their general conclusion has been that desiccated blood serum or plasma may be transfused with probably no risk to the recipient, even though the donor had syphilis. However, Turner and his group based their conclusions on a ninety-day ob-

servation period following the injection of rabbits with reconstituted dried plasma derived from syphilitics. Consequently, their experiments recently have been repeated by Probey of the U.S.P.H.S., with the view to extending the period of observation and to gain further data as well.

Probey observed that rabbits which were inoculated with restored dried material did not develop evidence of syphilitic infection during approximately one-hundred-forty days' observation. Three successive sub-transfers, observed for thirteen, seven, and nine months, respectively, also remained negative. Consequently, he concludes that *Treponema pallidum* apparently is killed during the deep-freezing and drying process. Processed (frozen and dried) human plasma or serum containing not more than one per cent moisture may be used with impunity.

SUGGESTED READING

Turner, T. B., and Diseker, T. H.: Duration of infectivity of *Treponema pallidum* in citrated blood stored under conditions obtaining in blood banks. Bull. Johns Hopkins Hosp. 68:269, 1941.

Turner, T. B., Bauer, J. H., and Kluth, F. D.: The viability of the spirochetes of syphilis and yaws in desiccated blood serum. Am. J. M. Sc. 202:416, 1941.

Probey, T. F.: Loss of virulence of *Treponema pallidum* during processing of dried blood plasma. Pub. Health Rep. 62:1199 (August 15) 1947.

POLIOMYELITIS VIRUS

THE incidence of water-borne poliomyelitis may be greatly reduced by adequate and proper chlorination. Various investigators have found that poliomyelitis virus is readily inactivated with small quantities of either free chlorine or chloramine. Recently, Lensen and his associates have studied the effect of *p*H on the viricidal power of these agents.

In water with a *p*H of 6.85-7.40 the poliomyelitis virus was inactivated within ten minutes, in the presence of as little as 0.05 p.p.m. of free chlorine. When the *p*H range is raised to 8.95-9.25, the free chlorine residuals are less effective in inactivating the virus. In some experiments the virus was not inactivated even within an hour. However, when the viricidal agent is residual chloramine, without free chlorine, the *p*H of the water is of no apparent importance. Residual chloramine values of 0.5-0.75 p.p.m. usually inactivate the virus within two hours; values of 0.2 p.p.m. or less are not viricidal.

SUGGESTED READING

Lensen, S. G., et al.: Inactivation of partially purified poliomyelitis virus in water by chlorination, II. Am. J. Pub. Health 37:869 (July) 1947.

TELEVISION

THERE is no reason why television, like motion pictures, should not become a most important aid in medical teaching. Ruedemann, of the Cleveland Clinic, has reported his experience with this new technic.

In collaboration with the Chief of Education for the Navy and television technicians of Paramount Studios, Ruedemann developed a television set-up which televised, with amazing clarity, various surgical procedures. The apparatus was equipped with a loud-speaker, so that a running commentary of the operation could be given while the observers watched the television screen.

Use was made of a variety of lenses. The operators showed the general operative field, then switched to the telephoto lens for detail. Various filters gave striking contrast. All in all, Ruedemann believes the surgical amphitheater is doomed, for television enables the observer to see more and better than he has ever been able to before.

SUGGESTED READING

Ruedemann, A. D.: The use of television in medicine. Cleveland Clin. Quart. 14:145 (July) 1947.

R.W.C.

Consultation Service

This special consultation information service is offered as a regular monthly feature of *Postgraduate Medicine*. Readers are invited to call on this Service for answers to difficult medical problems from members of our Editorial Board best qualified to help. Each question will be answered by mail and those of general interest will be published each month. Address all communications to Consultation Service, *Postgraduate Medicine*, 512 Essex Building, Minneapolis 2, Minnesota.

ACID PHOSPHATASE IN DIAGNOSIS OF PROSTATIC CANCER

QUESTION: What is the physiologic function of acid and alkaline phosphatase? Is an elevated acid phosphatase diagnostic of metastatic carcinoma of the prostate? *M.D.—Wisconsin*

ANSWER: Phosphatase: an enzyme capable of hydrolyzing the phosphoric esters of erythrocytes and plasma derived from hexosephosphate, glycerophosphate and nucleoprotein with the liberation of phosphate. This material occurs in nearly all of the tissues of the body. The largest amounts are found in the bones and teeth during infancy and childhood.

Phosphatase found in erythrocytes is apparently different from that found in the tissues, plasma, and leucocytes so that probably two phosphatases exist. Under physiological conditions serum phosphatase is not only increased in teeth and bone development in infancy but during the healing of fracture, during alimentary hyperglycemia, pregnancy, following exposure to ultraviolet light and after the administration of ergosterol.

Some observers believe that phosphatase is synthesized by the osteoblast of bone.

Normal prostatic tissue is rich in phosphatase with optimum activity of a pH of 4.9. Phosphatase is also found in carcinomatous prostate gland tissue and at the site of the skeletal metastasis from this condition in the serum of these patients. In these bony metastases the ordinary or alkaline phosphatase may be raised as it is in osteitis deformities, but in the latter the acid phosphatase value is within the normal limit.

Estimation of the acid phosphatase concentration in the serum is a useful supplement to the clinical and radiologic examination of patients with carcinoma of the prostate gland. Increased values of acid phosphatase may be the first and only indication of prostatic carcinomatous metastasis to bone or locally. (Refer to books on *Clinical Diagnosis by Laboratory Examination* by Kolmer and others.)

It is this prostate phosphatase which is believed responsible for the gigantic rise in the blood serum and is due to the dissemination of the malignant epithelium outside the boundary of the gland and into the blood stream. Conversely while a carcinoma remains localized and within the capsule there is no elevation of the acid phosphatase, although Robinson and Gutman state that small elevations may occur in non-prostatic bone disease. A study of Barringer's reports in the *Trans: G. U. Surgeons* indicated that carcinoma with metastasis to bone or distant soft tissues may not show elevations. This may be due to a deficiency of the enzyme, or the peculiarity of the tumor or its blood supply. When it is elevated it is specific in the height of its elevation. This may be used as an indication of therapy effect after orchidectomy. Within forty-eight hours there is a drop and it may continue to recede to normal. After estrogenic suppression the fall is slower. A rising return toward the original figures indicates recurrence of activity and metastasis.

Metastasis to bone usually produces higher serum acid phosphatase than does metastasis to soft tissues. (Woodward and Dean).

Both Barringer and Dean state that the serum alkaline phosphatase following estrogenic or castration therapy may increase. This is due to the healing of the bone lesions or an increase in the osteoplastic metastasis or possibly a sex hormone effect on bone development (Keto-steroid metabolism). It is agreed that with the rise of serum alkaline phosphatase there is no clinical correlation between it and x-ray or clinical response.

It is interesting to note that tumors of the blad-

der, rectum, and prostate may be differentiated by the serum acid phosphatase levels or by removing a biopsy section for acid phosphatase determination. It is almost specific for prostatic malignancy (carcinoma) to show a much higher content than other sources. Malignant tumors that may metastasize to the prostate will still not show the very marked elevation in acid phosphatase.

REFERENCES

Barringer: Tr. Am. A. Genito-Urin. Surgeons. P. 297, 1943.
Dean, A.: *Ibid.* 1942.
Woodward and Dean: J. Urol. 57:158, January 1942.
Gutman and Gutman: J. Clin. Investigation. P. 473, 1931.
———Am. J. Cancer. Pp. 28 & 485, 1936.
———Proc. Soc. Exper. Biol. & Med. P. 39, 1945.
Huggins: Physiol. Rev. P. 25, April 1945.
———J. Exper. Med. P. 72, 1940.
———J. A. M. A. P. 131, 1946.
———J. Urol., April 1946.

CESAREAN SECTION

QUESTION: I would like to ask your Consultation Service: 1. Their feeling on "once a cesarean always a cesarean." 2. Instead of doing a postpartum sterilization abdominally, why not do cesarean and tubal ligation thereby saving the patient the expense and discomfort of two procedures instead of one, in spite of the slight additional risk connected with the cesarean?

M.D.—California

ANSWERS: 1. Like all rules the notion of "once a cesarean, always a cesarean" has some exceptions, but once a woman has had a cesarean section before delivery through the pelvis, most obstetricians feel that it is better to repeat the cesarean section, because of the risk of rupturing the uterus. While this risk is probably less than 4 per cent, such a serious accident if it occurs carries a mortality rate from 12 per cent to 40 per cent depending on the circumstances. If a cesarean is done because of disproportion, it should be repeated even though pelvic delivery has taken place in the past.

2. The answer to this question is perhaps explained in the last portion of the question; namely, that "there is a slight additional maternal risk." Abdominal delivery, while much safer than formerly, will perhaps never be as safe as a normal delivery through the pelvis. Those who report the use of early puerperal abdominal tubal sterilization seem fairly satisfied with their results, and such a procedure minimizes hospitalization and other expenses and is occasionally applicable.

FLUORINE IN PREVENTION OF CARIES

QUESTION: Would you recommend the use of fluorine to prevent caries? If so at what age? In what way is it best administered topically? What is the explanation of its action in the prophylactic application?

M.D.—Illinois

ANSWERS: From epidemiological studies of children aged 12 to 14 and from animal studies in which comparatively large amounts of fluorine can be administered, a body of evidence has been accumulated which, beyond doubt, connects an optimal amount of fluorine in the drinking water with reduction in incidence of caries. The use of fluorine as a therapeutic agent is still in the experimental stages.

The body of evidence suggests that the first 10 years of life are the most valuable ones in which to administer fluorine if benefit in caries reduction is to be obtained. Some protection may possibly be obtained in later years.

Topically, the method we have used here is to clean and dry teeth, dip wisps of cotton in 1 or 2 per cent NaF solution in water, wipe the teeth with the cotton—one quadrant of the jaw at a time—protecting the rest of the mouth by cotton rolls. The period required for a complete treatment as we do it is 20 to 40 minutes. At the present time, we are giving children four treatments one week apart and repeating it at six-month intervals. There is no evidence that this is the best procedure.

The explanation of its action is not understood. A few factors which may be involved can be listed:

1. Fluorine is rapidly removed from solutions in contact with tooth surfaces and firmly bound to the tooth surfaces.

2. The solubility of such fluoride-treated tissues is considerably lower than that of untreated tooth tissues.

3. Production of oral organisms is reduced by fluoride.

4. Fluorides inhibit certain enzymes important in the metabolism of glucose.

MEN OF MEDICINE

FAMILY TEAMWORK IN KANSAS

THE Menningers brought Freud to the plains of Kansas and made Topeka one of the world's great psychiatric centers. The Menningers in Topeka are Dr. Karl and Dr. Will. The Menninger Clinic was developed by the sons of a pioneer country doctor, and represents the triumph of a modern therapeutic ideal: teamwork in the practice of psychiatry.

The Menninger Clinic has been the initial force in making a psychiatric mecca of Topeka. On the other side of town, Karl Menninger, with the help of the clinic staff, is molding the army's former Winter General Hospital into a model psychiatric center that is the pride of the Veterans Administration. Dr. Will serves as general director of the Menninger Foundation, a post he assumed in August 1946, when he laid aside his brigadier-general's uniform as wartime chief of the Army Medical Corps psychiatric division.

The Menningers today represent a most famous brother team in American psychiatry. Both have served as president of the American Psychoanalytical Association. Last May, Dr. William C. Menninger was elected to the presidency of the American Psychiatric Association, while Dr. Karl A. Menninger headed the reorganization committee which brought about the biggest reform of the past half century.

Psychiatrists, nurses, social workers, research scientists, occupational therapists, and other members participate on an equal plane in periodic staff conferences. Professional jealousies and resentments that poison the atmosphere of many another mental hospital are rarely in evidence. The ideal of group practice is fully realized—the pooling of skills, knowledge, and technics toward a common goal: optimum improvement of the patient in the shortest possible time.

The Menningers and their associates conceive the mental hospital as a "therapeutic community," not as an institution. The day's activities for both patients and staff are "socialized" to the closest possible approximation of everyday "normal" living. Patients, doctors, and employes mingle, so that it is often difficult for the casual visitor to tell which is which as he makes the rounds of the sanatorium.

Even visiting relatives, instead of getting the usual brushoff, are coached on how to make their visits most helpful, what kind of letters to send, and how they can best aid in readjusting the patient to home life when he returns.

Patients are brought together in group play and group discussions, where they gather strength and self-knowledge through talking out their problems.

The Menninger Clinic is dominated by no psychiatric cult, nor on the other hand, is it characterized by any vague philosophies and opportunistic technics. The staff, generally, follows Freudian psychoanalysis. But Freud, in Topeka, is respected as a great scientific pioneer, not worshipped as a medical Moses or Mahomet; his writings blazed trails but are not holy writ; his system is accepted as a science, not a religion. A stream of celebrated leaders in psychiatry, representing many schools of thought and treatment, flows through Topeka, keeping the staff current on the latest trends in the theory and practice of their craft. This cross current of ideas prevents stagnation.

The Menningers themselves are Freudian-oriented eclectics. They have avoided the rigid sectarianism that has divided many of Freud's disciples into camps of warring, intolerant doctrinaires.

Sanatorium patients are charged $650 a month for treatment—a stiff tariff. The Menningers are sometimes criticized for this high rate; the truth is that patients' fees have never amounted to enough to put the place in the black.

The high rate goes strictly into psychiatric treatment, not into luxurious accoutrements. The staff

Condensed from *Survey Graphic*, September 1947.

KARL A. MENNINGER, M.D.

tells you the place is a hospital, not a country club. Patients aren't coddled, the surroundings and the fare are plain. There is no amusement for amusement's sake; recreation is integrated into a therapy program. The Menninger Sanatorium is not a "rest home." Dr. Karl, at a recent meeting of the American Medical Association, lashed out severely at the "abuse of rest" in treating psychiatric cases, blasting the celebrated "rest cure" for neuroses and citing proof that prolonged rest often did more harm than good to tensed-up patients with unsolved emotional problems.

The sanatorium has room for only fifty-five patients, an infinitesimal fraction of the millions who need treatment. But the enterprise has national significance for two special reasons: it is a focal point for training psychiatrists in the face of an appalling shortage (there are less than 4,000 of these specialists in a country which desperately needs a minimum of 20,000); and it is a vital research center to help dispel the vast mystery that still hangs over the field of mental disorder.

MENNINGER Clinic is the name loosely applied to a group of enterprises that make up a compact psychiatric center operated on a nonprofit basis by the Menninger Foundation. There is the clinic proper, which gives psychiatric services to mental and nervous patients who live off the grounds. There is the sanatorium, comprised of several reconverted dwelling houses.

The Menninger School of Psychiatric Training is developing doctors in the psychiatric specialty. There is training for psychologists and social workers, conducted in part in cooperation with nearby Kansas University at Lawrence. And the affiliated Southard South, named for the Harvard psychiatrist who gave Dr. Karl his early training, is a year-round boarding school for problem children of normal or superior intelligence.

Menninger doctors also staff Topeka's municipal mental hygiene clinic, giving out-patient service to emotionally disordered Topekans who can't afford private treatment. I attended one of these clinic sessions with Dr. Harlan Crank of the Menninger staff. Among the run-of-the mill cases that day were these:

A thirteen-year-old boy who reacted to his emotionally disturbed mother's obvious attitude of rejection and hostility by chronic bed-wetting and unruly behavior at home and school.

A middle-aged ex-denizen of a house of ill-fame who had developed paresis, a frequent end result of untreated or poorly treated syphilis.

A three-year-old who was mute and mentally backward although there was no apparent organic cause of either condition. Investigation had revealed that a too doting mother had smothered the child's initiative by anticipating every desire without giving him a chance to learn to ask for things.

There is a close tie-up between the Menninger Foundation and the Winter Veterans Hospital, which Dr. Karl has managed since January 1946. He accepted the post on the challenge of Veterans Administrator Omar Bradley and his medical aide, Major General Paul R. Hawley, to take over this abandoned army hospital, and transform it into a model center for mental and nervous disorders. There are now 1,200 patients, all veterans, most of them neuropsychiatric cases, with a sprinkling of general medical and surgical cases.

Also, some 125 young doctors, veterans themselves, are becoming specialists in psychiatry at Winter. They work under the faculty of the Menninger School of Psychiatric Training, supervised by Dr. Karl. The significance of this enterprise may be gauged by the fact that the 125 Winter residents in training represent half the total being trained in the entire VA program, and a third of the number being trained in all American medical institutions.

Winter Veterans Hospital is governed by the "total push" approach. Every detail is aimed at speeding recovery; every form of modern treatment is utilized—electric and insulin shock, sodium pentothal, hypnosis, occupational therapy, drama therapy, and so on. Underlying all treatment, however, is the basic idea of psychotherapy—stressing the psychological over chemical or mechanical methods of treatment.

The re-socializing process implicit in the "therapeutic community" plan is advanced by developing teamwork among the patients. Wards form basketball, softball, and table-tennis teams. Ward teams compete in carefully scheduled games: uneven contests are avoided to prevent loss of self-esteem by the losing team and the ward it represents. Self-government is stimulated by having the patients elect ward committees to promote orderly behavior and transmit ward gripes to the authorities.

C. F. MENNINGER, M.D.

BACK in 1908, Dr. Charles F. Menninger, a Topeka physician with an insatiable yearning for fresh knowledge, journeyed to Rochester to see at first hand what the growing Mayo Clinic was all about. He talked to Dr. Charlie and Dr. Will and to their father, a surgeon, who had started his sons' way to group practice. He spent a week and returned, a convert to the group teamwork idea.

At home again, he told his wife, Flora, and his two sons that medical knowledge had become too complex for any individual to master satisfactorily, and that the way of modern medicine was by groups or teams where skills, technics, and equipment could be pooled under one roof.

He calmly announced he was going to start a group practice clinic in Topeka. But his confreres turned a cold shoulder to his evangelism, so he patiently waited for his sons to grow up. Karl, born in 1893, got his M.D. at Harvard in 1917, was a navy lieutenant during World War I, returned for postgraduate study, became a protege of the psychiatric genius, Professor Ernest E. Southard and went back to Topeka where he and his father started the Menninger Clinic in 1923. When Brother Will, born in 1899, took his medical degree at Cornell in 1925, he made the team a trio.

The Menninger Clinic, treating mental cases on an out-patient basis, with the patients living off the grounds, steadily expanded. Through the years, this practice turned Topeka into one of the most psychiatry-conscious communities in the land.

World War II separated the Menningers, and marked a new turn in their careers. Dr. Will went into the army and rose to be chief of the Medical Corps Neuropsychiatric Division. Dr. Karl stayed in Topeka, holding together the Menninger enterprises and needling the country on the critical need for training psychiatric personnel to meet the inevitable acute postwar shortage.

THE brothers were reunited last August as a working team. The tall sons of old Doctor Menninger fit together like carpenter's mortise and tenon joint. Contrasting sharply in personality, they are almost the perfect foils for each other.

Dr. Karl is restless and excitable, often explosive and epigrammatic in conversation, throwing out sparks. Psychiatrists who delight in diagnosis might call him an extrovert manic type. He is one of the can't-sit kind, pacing the floor and punctuating his cascading words with sweeping gestures of his cigarette-holding hand. The gruff mannerisms and bluff talk cause many a casual acquaintance to miss the exceedingly sensitive heart beneath the defensive armor.

Karl Menninger is an idea man, a sparkplug, a promoter. Often, during a hot parlor discussion he will cut in: "All right, we've done a lot of talking about this. Now what are we going to DO about it?"

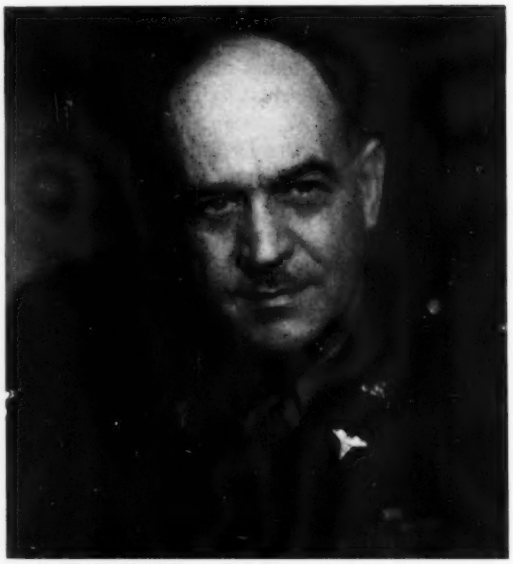
Like as not, his friends will hold up their hands in mock horror: "Please, Karl, don't organize us AGAIN!"

Dr. Will is more cautious in statement, less ebullient, far gentler in approach, sometimes almost shy. His modesty is unaffected and disarming. He has a knack of breaking down suspicion and jealousy in a profession peculiarly replete with hostilities.

When he was appointed neuropsychiatric chief of the army, many skeptics prophesied that chaos would ensue. Orthodox military psychiatrists would never follow an avowed Freudian, and Menninger would be too soft to stand the gaff of line officers prepared to scuttle any reforms he'd attempt. General Menninger overcame the obstacles amazingly. His men gained the grudging respect of the regulars, and the army's archaic system of dealing with mental disorder was drastically modernized and revised.

Dr. Will has just completed a book on military psychiatry in World War II. Dr. Karl already is the author of several popular psychiatric works, including "Love Against Hate," "Man Against Himself," and "The Human Mind."

Karl and Will Menninger lead rich private lives. Both are happily married. Both diligently pursue their hobbies. Dr. Karl is a chess enthusiast, and likes to wind up the day's work with a game. He acquired from his father a deep love for the soil, and is a board member of the society called The Friends of the Land.



WILLIAM C. MENNINGER, M.D.

The latest organizing achievement of the dynamic Menningers may prove ultimately to be their most important. At the 1946 annual meeting of the American Psychiatric Association in Chicago, they led a group of so-called Young Turks, consisting mainly of war veterans and including many notables, in the informal organization of the Group for the Advancement of Psychiatry, abbreviated to GAP. A major motivating force was dissatisfaction with the slowness with which organized psychiatry had responded to the emergency demands of the war and postwar periods.

Meanwhile, from their home base in Topeka, the Menningers radiate a fundamental philosophy —a mixture of grass-roots democracy and the Freudian faith in love as the effective weapon against the destructive forces of hate and fear.

What Other Editors Think

Editorial Evaluations of Current Contributions To Medical Progress

PREVENTION OF RENAL COMPLICATIONS BY THE USE OF SULFONAMIDE MIXTURES

Among the most frequent of the serious complications attending the use of the more effective sulfonamide compounds are those involving the urinary tract. These are caused predominantly by mechanical factors associated with the precipitation of crystals of the free or acetylated drugs anywhere along the urinary tract, and they are most serious when the precipitation occurs within the kidney tubules. These complications are dependent, in turn, largely on the solubility and the concentration of the compounds in the urine. Any measures that increase their solubility or prevent their excessive concentrations in the urine should therefore diminish the frequency with which precipitation occurs and hence reduce the incidence of renal complications.

These considerations have led to attempts to utilize mixtures of different sulfonamides.

Lehr used sulfathiazole and sulfadiazine in equal amounts and showed experimentally that this combination produces a low renal toxicity and has a high antibacterial activity. Clinical studies in patients with acute bacterial infection in both adults and children indicated that this mixture, given in the total doses ordinarily employed with single compounds, yielded uniformly satisfactory therapeutic results. Effective blood levels and high sulfonamide concentrations in the urine were readily maintained with these doses. When treatment was stopped, the mixtures were rapidly cleared from the body. Crystalluria was infrequent despite the intentional omission of adjuvant alkali therapy, and no signs of renal irritation were encountered. The incidence of allergic reactions, moreover, also appeared to be lowered.

Extensive studies with sulfonamide mixtures ("sulfa-combinations") have also been carried out by Frisk and his co-workers in Stockholm. They found that the antibacterial effect of such a combination was equal to the sum of those of the individual components.

The most suitable composition per gram was found experimentally to be 0.37 gm. of sulfathiazole, 0.37 gm. of sulfadiazine and 0.26 gm. of sulfamerazine. This mixture had almost the same absorption and excretion relations as sulfadiazine. There was practically no risk from accumulation in the blood, even when high doses were administered. In the doses ordinarily used in the treatment of pneumonia, the combined preparation is not excreted in supersaturated solutions if the reaction of the urine is approximately neutral. With the individual components given in equal doses, on the other hand, either the free or acetylated form always occurs in the urine in supersaturated solution, even in a neutral urine. The Swedish workers thought that the use of this mixture appeared to eliminate the risk of the formation of concretions in normal kidneys. As added precautionary measures, however, they state that diuresis should be maintained and that alkalies should be given. This method is considered to have the advantage of permitting the use of larger doses than usual with less danger of renal complications in cases of infection due to the more resistant bacteria.

The New England Journal of Medicine, Vol. 236, p. 842, Robert N. Nye, M.D., Managing Editor.

RADIOACTIVE PROGRESS

In delivering the twenty-fourth Mackenzie Davidson Memorial Lecture of the British Institute of Radiology, Dr. John Lawrence, of the Crocker Radiation Laboratory, Berkeley, California, brought with him the first analysis of 90 cases of polycythemia vera treated with P^{32}, and 20 further cases which had not been. His real controls were, however, a Mayo Clinic series of 163 cases.

of which the survivors at the end of five years numbered 36. This proportion is liable to revision, but is now regarded as the best figure available.

Of the 90 cases treated at Berkeley, the earliest goes back to 1939, and the number of deaths to date has been 13. Also, whereas the average age of those treated was 48 years, the average age of those who died was 66.6 years. More encouraging even than these overall figures was the analysis given of causes of death. These included 4 cases of cardiovascular disease (of which 3 were at ages between 70 and 80), 1 of acute pancreatitis, and 3 of carcinoma. None of these 8 deaths was regarded as attributable to, nor was there any evidence in the 3 latter cases of induction of, carcinoma.

At the most, therefore, only 5 cases remained in which it appeared possible that the cause of death could reasonably be connected with either the polycythemia or the treatment given for it. As to 4 out of these 5 cases (3 leukemia and 1 multiple myeloma) no useful opinion could be expressed. Finally, there was only one death from thrombosis in the whole series, which in most previous series has been a common sequel. Follow-up studies are being continued, but in relation to the severity of the disease, radio-phosphorus therapy would appear to have already been justified.

As two examples of the tracer technic of direct and related interest to medicine, Dr. Lawrence instanced the use of radio-sodium and radio-gold for the study of the symptoms and treatment, respectively, of rheumatoid arthritis. The effect in the former case has been to confirm quantitatively the clinical picture of impaired circulation.

Using a rabbit, in one leg of which arthritis had been chemically induced, it was demonstrated with radio-sodium (Na^{24}) that the rate of blood flow in the affected leg was nearly twice as slow to the articular cortex, more than three times as slow to the synovia, and more than four times as slow to the tendons as in the other and normal leg. On the side of treatment, it has been similarly shown with the aid of radio-gold (Au^{198}) that the distribution of colloidal gold is such as to lend plausibility at least to this form of therapy. The concentration in the synovia has proved to be rather more than ten times as great as in the muscles, so that absorption may fairly be claimed to be selective to that extent—although, as Dr. Lawrence was careful to point out, the presence of gold in the desired locations provides no proof in itself of beneficial effect.

British Medical Journal, July 26, 1947, p. 139.

ECZEMA AND ESSENTIAL FATTY ACIDS

INFANTILE eczema can be a most intractable condition, distressing in different ways to infant, parent and medical attendant. The relation of its occurrence to a disturbance in essential fatty acid metabolism has been the subject of investigation for some time now and appears to offer encouraging possibilities. Arild E. Hansen, Elizabeth M. Knott and Hilda F. Wiese, of Texas, and Eve Shaperman and Irvine McQuarrie, of Minneapolis, in a combined paper have presented recent investigations and their conclusions.

A total of 225 patients with eczema were investigated both clinically and by the study of their blood lipids. The findings in 101 control subjects were used in evaluating the significance of the blood lipid studies; the only practicable control method in the clinical approach was by the use, for observation, of preliminary "control periods" usually of four or more weeks, before any significant change was made in the therapeutic regimen.

Serum lipid studies on 171 of the eczematous patients disclosed that 80 per cent of infants under two years of age, 75 per cent of children between two and fifteen years, inclusive, and slightly over 50 per cent of adults had iodine numbers for the serum fatty acids below the mean values found for the 101 controls. When used as the sole form of therapy for 148 eczematous patients of various ages, addition to the diet of fats rich in unsaturated fatted acids, such as fresh lard and certain vegetable oils, produced a clinical response judged to be good to excellent in 60 and fair to good in 51 instances. The remaining 37 patients showed slight to no benefit. Most of the latter were in the older age group. The lard, which was sometimes mixed with other more palatable foodstuffs, was given in amounts averaging one to two ounces daily.

Periodic studies of the serum lipids for patients

with eczema revealed a tendency for the iodine numbers of the serum fatty acids to increase as the clinical condition improved following supplementation of the diet with fats rich in unsaturated fatty acids. An increase in the degree of unsaturation of the serum fatty acids was observed also to coincide with clinical improvement of patients treated solely with crude coal tar ointment.

Hansen and his co-workers, while being convinced of the clinical improvement which follows the inclusion in the diet of fats rich in unsaturated fatty acids, emphasize the importance of meticulous investigation and the use of other forms of treatment. In their experience the combination of the unsaturated fatty acid regimen with such therapeutic procedures as topical applications of crude coal tar ointment and elimination from the diet of all foods to which the patient is known to be sensitive has proved to be most successful. Their results among infants were much better than these among adults.

It seems likely that benefit will come from the administration of unsaturated fatty acids to patients, especially infants suffering from eczema, but such therapy is at present rather empirical.

The Medical Journal of Australia, Vol. 1 of 1947, p. 709.

CIRCULATORY CHANGES WITH POSITION

Erect posture, according to the biologists, developed because man's progenitors were tree dwellers. The fact that he walks on two legs gave him free use of his hands, and thus made possible the use of tools and subsequent intellectual development. Upright posture has also been blamed for many chronic diseases: circulatory disorders such as varicose veins, descent or prolapse of various organs, and various digestive disturbances.

Various means have been employed to measure blood shift in the body, blood volume changes, and their physiologic effects. One of the recently studied methods is by determination of the center of gravity of the body, which changes during the fatigue of standing and after static effort. According to Larsen, the changes of center of gravity after standing show an excessive accumulation of blood in the lower parts of the body with draining of the upper part. The resulting under-oxidation of the brain parallels the early onset of fatigue.

Other workers have used the reactions of the body after tilting from the horizontal position, as a measure of recent blood loss. Green and Metheny of Seattle, note changes in the heart rate and blood pressure after postural changes, and have attempted to correlate these with a clinical method of estimation of the patient's blood volume and amount of recent hemorrhage. Blood volume estimations by the dye method, they remark, though known for many years, are so cumbersome as to be very little used. They studied normal persons before and after venesection of known amounts of blood, and patients admitted for recent gastrointestinal or other hemorrhage.

The subjects were placed on a fluoroscopy table and tilted at several different angles from the supine position. Changes in the heart rate and blood pressure and a break in compensation occurred on tilting of persons who had lost blood. The more blood had been withdrawn, the more acute the symptoms and the greater the cardiac acceleration to tilting. They conclude that an increase in heart rate of less than twenty-five beats per minute on raising the patient to a standard angle, in the absence of a syncopal reaction, indicates either a negligible or a compensated blood loss, which does not require transfusion. An increase on tilting of 30 beats or more per minute suggests a probable loss of 9 to 14 cc. of blood per kilogram, and a transfusion requirement of 1,000 cc. Syncopal reaction to tilting suggests need of 1,500 cc. of blood. Shock maintained in the supine position indicates a probable blood volume deficit of 20 cc. per kilogram and need for a 2,000 cc. transfusion. Hemoglobin level has no relation to blood volume, and may fall as blood volume rises.

This work emphasizes the importance of the horizontal position as therapy. Heart rate and blood pressure changes should probably be observed carefully in persons permitted to rise early after operation or after an obstetric delivery in which hemorrhage has occurred.

Southern Medical Journal, Vol. 40, No. 9, p. 796.

FROM A FOREIGN CONTEMPORARY

Observations on the Psychology of the Tuberculous*

GEORGE DAY

RESIDENT PHYSICIAN, MUNDESLEY, SANATORIUM, NORFOLK, ENGLAND

THE material for this study is drawn from a rather specialized class of tuberculous patients. Our patients are mostly hard-working, professional men and women who pay for sanatorium treatment, and are drawn from the Army, the Navy, the Church, and the stage—barristers, doctors, schoolmasters, business men, and their wives, sons, and daughters.

The patients have not been subjected to the stresses and strains classically held to be responsible for pulmonary tuberculosis—malnutrition, overcrowding, bad working conditions, or exposure. Then why do they break down? Obviously because they have become infected by the tubercle bacillus (as we all do); but for some reasons their tissues are in a condition to give it a good home instead of destroying it or imprisoning it for life. Is it just by chance that their tissues are so hospitable?

In 1935 I noticed a striking thing. So often there emerged from the patient's recent history an unhappy love episode. Girls had been jilted, young men had become engaged to the utterly wrong girl, and were in painful conflict realizing it more or less consciously. This state of affairs seemed to be far commoner than chance would warrant. It looked as if the Victorian novelists had got hold of a little-understood truth when they portrayed their lovelorn heroines going into a decline.

Another puzzling aspect was that tuberculosis struck down young adults. Why? The physical body should surely then be at its prime. It is fully grown: metabolism is no longer concerned in part with growth and development but entirely with repair and replacement. Could the answer be that young adulthood is a time when emotional stresses reach their highest peak? In the group I am discussing, it is a time for weaning from the family circle and the backing and security of the home. Then men in particular have to stand on their own feet and accept the consequences of their choice, be it of helpmeet or lifework. It is a time of hopefulness, too much hopefulness perhaps; but it is a worrying time, indeed a frightening and suicidal time for some.

In 60 per cent of these cases I could discern a very good reason why tuberculosis or some similar chronic incapacitation was necessary to them at that juncture. I could also see why it would continue to be necessary to them, unless something in their life-pattern suffered change. But it was disappointingly seldom that I was able to do anything to bring the change about.

So in 30 per cent of the whole sanatorium population, I decided, the patient was sick in mind as well as body.

CASE OF THE YOUNG DOCTOR

My first case is that of a young Irish doctor who developed pulmonary tuberculosis while doing a house physician's job in the south of England.

> Alan was a popular stocky little fellow, full of vitality, who rapidly became persona grata with everyone in the sanatorium. His lesions, however, failed to respond to treatment, and he was still on bed rest at the end of six months. An artificial pneumothorax was attempted, but it did not relax the cavity-containing zone, because there was an intractable adhesion holding it out. He had a three-month course of "Sanocrysin" injections with-

*A paper read to the Northfield Psychiatric Society, Northfield Military Hospital, Birmingham, and reprinted, in part, from *The Lancet*.

out converting his sputum even temporarily. At the end of six months his general condition was good; he had gained lots of body-weight and looked and felt fighting fit, but his rectal temperature rose to 99.7° F. each evening; his sputum, though scanty, was still positive; his blood-sedimentation rate remained steadily higher than it should have been. His disease activity was in statu quo.

Then we crushed his phrenic nerve. It worked like a charm. His diaphragm rose and within a few days his temperature had dropped to normal limits. His B. S. R. dropped steadily and he was sputum-free. And then he awoke early one morning with glove-and-stocking anaesthesia. Being a doctor, he had diagnosed it himself before we could answer his bell, and we found him bellowing, "Why the hell have I got a conversion hysteria?" It was no good asking *us*. We didn't know. He started sweating almost continuously; he couldn't sleep; and by the end of the week he had shrunk a stone in weight.

Then one evening in a darkened room he told his story. He was a Roman Catholic, and his fiancee, who was an extremely nice girl, was also a Roman Catholic. But he was possessed, as it were, of two personalities, a saint who was a devout practicing Roman Catholic and a sinner who wasn't; and they were not on speaking terms. The saint adored his beloved with religious fervour, but the sinner treated her differently. His fiancee was devoted to him, but was shamed at being forced to enjoy prenuptial bliss against her better inclinations. So their relationship became degraded in both their eyes, and they were pretty miserable though deeply in love with each other. I think it is significant that he took a house-job in the south of England—just about as far from Ireland as he could get.

Here he became involved with a nurse, developed the signs and symptoms of tuberculosis (with, he confessed, no little feeling of relief), and sped back to Ireland to his mother and his fiancee. He was not too easy there and he again elected to return to Mundesley, where he was happy, carefree, and well esteemed by his fellows. Now, when he showed signs of getting better of his tuberculosis, he himself gets very sick in spirit. It seemed obvious that he was not yet ready to re-enter the world from which tuberculosis had afforded him escape.

What seemed so odd to me was that he had never grouped all these phenomena in his own mind before; but then I suppose people don't. When it was pointed out to him, he did see it and he *did* see that the saint in him and the sinner in him had to be reconciled and come to terms and be atoned, if he wanted to become an integrated human being.

The next thing that happened was that he sent for his fiancee, confessed all, and was forgiven. He made a rapid and uninterrupted progress from then onwards.

Two years later I ran into him again, and he was simply crackling with good health. But I noticed he did not introduce me to the girl he had with him. I couldn't help wondering whether the saint hadn't mixed a little too freely with the sinner, and ended up like the young lady from Riga.

FANTASIA

From a particular and completely unvarnished history I wish to turn to a blended version of several cases which had sufficient points in common for this operation. Here is an extract from an article I published pseudonymously just before the war:

"The most hopeless case is the one who exhibits what I call the 'Dornford Yates syndrome.' She (and it's nearly always a she) really believes that somewhere round the corner there exists such a world as that gifted writer portrays in his delirious fantasies: a world where women are worshipped from the crowns of their heads to their glittering insteps by clean-limbed leisured sportsmen with a taste for witty philandering; where every lawn is centuries old and every car a Rolls. It is a make-believe world we create whenever we put on evening dress and smoke cigars and behave a little above ourselves; but most of us accept the two-penny bus-ride back to reality with something like relief.

"The 'D. Y. S.' not only believes it exists, but that it is her rightful kingdom from which she is exiled. Disabling illness of any kind provides an escape from reality into a world which matches her fantasy. On her admission to a nursing-home or sanatorium she enters her kingdm—or should I say queendom? Enthroned in bed, she gains the power and the glory about which hitherto she has only been able to dream. Meticulous service she exacts from all who attend her. Visitors, inquiries, gifts of flowers, and exciting negligees all heighten the illusion. Her rapid unpopularity among the other patients is, of course, rationalized. 'The other patients dislike me, my dear, simply because the doctors make rather a favourite of me,' confided a Queen Me to a newcomer (who went to the trouble of ascertaining if it were true!)—'I have never been so neglected in my life,' she once snapped at a goggling floor-maid, and added, skilfully avoiding understatement, 'but then at home I had seven servants.'—'Really, mum, would that be all together or one after another?' innocently asked the floor-maid; and was reported for impertinence.

"Reality has an uncomfortable way of breaking

through the best fantasies, and when it does, the time has come to move to another establishment, bearing horrific tales of the short-comings of the last one which forced the patient to abdicate.

"Now, the striking feature about cases of this kind is not that the disease runs a sluggish and protracted course, but that all attempts at adjuvant treatment seemed doomed. A malign Fate seems at work. A dramatic improvement once occurred when a husband's interest was found to be straying elsewhere. . . . But it might equally well have caused a dramatic decline, so it is not to be advocated. She is, after all, the victim of a disorder more intractable even than her tuberculosis, which is in comparison only a stage-property. She is perfectly adjusted to being an invalid, so why should she get well?"

PSYCHOLOGICAL ASSISTANCE

IN GENERAL practice, having decided an illness is functional and psychopathological in origin, one is faced with the problem—what is to be done about it? It is profoundly difficult to bring home to a patient one's conviction that he has within him a "black spot, not so big as a pin's head, but waiting to spread and destroy him in the fullness of time"—when the black spot is neither cancer nor tubercle but—Fear. Unless seriously distressed, patients in private practice are apt to take umbrage at the mere suggestion that they should undergo any systematic psychological treatment. It is an aspersion on their sanity. But delicate, difficult, and disagreeable as the task may prove, such a patient must have it brought home to him that he is sick at heart as well as in body, and that he can be helped to help himself. Before anything can be attempted he must become aware of a need for help and feel a genuine desire for it. Only then will he cooperate without doubts and misgivings.

Personally, I have found that dream analysis meets most situations, if you have the time; and in sanatorium practice you have plenty of time. It starts off like playing a new game, but soon becomes more and more engrossing and deeper and deeper in its effect, and eventually the patient gets the knack of analyzing his own dreams with a minimum of guidance. In fact, he does all the work, and in my happy experience, at this stage your presence is almost purely catalytic. If your suggestion misses the mark, it bounces off and is ignored. You have done no harm. But if you hit the gold, it "brings him up all standing and carries away his bob-stay"; or perhaps, better still, your suggestion is angrily repudiated, resisted, and rejected. But you have sown the seed, and it is only a matter of time before it flowers.

A discontented ex-patient, who was living alone in lodgings in the village (rather than go home to her mother, putting off the evil day), used to come up to see me twice a week. Her mother was her chief immediate problem. The mother was a deaf and dowdy earnest woman who rather disliked her darling daughter but did not know it. The darling daughter detested her mother, knew it, and gloried in it.

One day the girl was pouring out a long dream with her own running commentary, but my mind was elsewhere. The village amateur dramatic society, I knew, was about to start work—just the thing for her! Give her a chance to meet some people purposefully and not merely socially. She'd be able to give herself a much-needed rest for two or three evenings a week. Impulsively I blurted out, "Are you interested in amateur theatricals?" "I *loathe* amateur theatricals," she replied. "Why?" "All right, all right. Don't snap my head off. Nothing, nothing. Go on. I'm listening."

Next time she came to see me, she said, "Sorry I was dense. The penny didn't drop until the next day. I know now why you asked me about amateur acting. It's perfectly true; I *am* dramatizing myself the whole time. I never realized it before. What can I do about it? I find I'm doing it the whole time, blast you." For the first time she was completely natural.

And that is the way of it. Very often one's most cryptic utterances, which one could not explain or defend if challenged, may bear fruit.

In my next case I used dream analysis and unearthed material I could not possibly have got any other way, for the patient was intelligent and intellectual and had an almost maddening amount of poise.

She had read more Freud than I had, and thought there was a tremendous lot in it—applied to other people. By his standards she judged herself to be pretty well all right. This patient was a doctor's wife and therefore had not been diagnosed until both her lungs had become pretty extensively excavated. She was treated with bilateral A. P. S., adhesions were cauterized on both sides, and from the viewpoint of pure lung-carpentry we achieved what we wanted. But she did not heal.

Her dreams showed clearly that her marriage

was a failure—more, that it was in effect her wasting disease of which her tuberculosis was a somatic expression. She had never admitted that she was ill-mated, even to herself. Her husband, who had a touch of the Asiatic in his blood, was an expert and experienced love-maker. One moment he fascinated and terrified her by his ruthlessness, and the next could put on a "hurt small boy" act which never failed to arouse her motherly feelings. At every turn she was completely in his power and completely frustrated from being herself when he was about.

One dream I would like to relate without comment. She was fishing in clear, deep water from the lower steps of a jetty, when suddenly a sort of Loch Ness monster reared its ugly head and rushed across the bay straight at her. She turned, screaming in terror, and fled up the steps to me, who was standing at the top, and awoke.

Eventually she decided to divorce her husband for cruelty, both mental and physical, for which she had a very good case, and her papers were sent in. Her tuberculosis which had hung fire all these months began to get better.

The case was defended and lasted three days. She had a gruelling time in the box, for her ruthless husband had left no sofa-cushion unturned in his search for letters of one sort or another with which to bolster up his counter-evidence. She came through well and won hands down.

After the decree nisi she was forced to have embarrassing dealings with her ex-husband concerning the welfare of their joint children, and her emotions towards him were rather confused. He was so charming, courteous, and considerate.

She continued to send me her dreams with her own interpretations for my comments. And this is the last one she sent me. She was fishing in deep, clear water from the lower steps of a jetty, as in the other dream, but on the other side facing east instead of west. Suddenly a sort of Loch Ness monster reared its ugly head and rushed across the bay at her. She turned, screaming in terror, and was about to flee up the steps, when she heard me chuckling with amusement. So she stood her ground and seized the monster in both hands. It shrank and shrank until it was a poor little iridescent minnow in the palm of one hand. She gently threw it back into the water.

(I *will* comment on this second dream. I think it pretty decent of her unconscious to drop us a line to let us know how we are getting on.)

She married again, this time a man more her own weight, somebody who laughs at the same things as she does, and her tuberculosis is arrested.

HAPPINESS IS NOT ENOUGH

To me, concerned with getting people to overcome tuberculosis by fair means or foul, that case strengthens my belief that a change of heart and a change of circumstances must be necessary before healing will proceed. My next one shows the effect of change of circumstances alone:

Peggy had an unfortunate early history. She never knew her father, her mother died when she was fourteen, and from then onwards she was self-supporting. She was in turn parlor-maid, cook, chorus girl, shop girl, mannequin, and glamor girl. She worked her way out to Canada as a stewardess and back again when she'd had enough. She then married a rather worthless playboy racing-motorist who was pretty poor, both in money-sense and woman-sense. She had to sell her jewels to keep him, and to work in a hat-shop to earn the rent for their flat. He contributed nothing unless he backed a winner with his pocket-money, when they blued it with the greatest enjoyment. It was only when he diverted her hard-earned rent to another woman's lap that she protested, walked out on him, and put in her papers for a divorce.

We next find her settled down comfortably as a young farmer's wife, leading a happy outdoor life, riding, rearing, and breaking in colts, tending the poultry-farm, and having lovely fun in the kitchen. It was an idyllic existence. The young couple were deeply in love with each other and the young farmer lavished all the good things on her that she had lacked before.

After a couple of years she developed a small patch in one lung and reddening of one arytenoid. These were discovered almost accidentally, one might say, owing to the thoroughness of her general practitioner; for there were no physical signs. It was for other symptoms she consulted him. She was six weeks' pregnant. In accordance with general usage she was advised to have therapeutic abortion, and this was done. After which no time was lost getting her under sanatorium treatment, where she was put on absolute rest.

From the hardships she had gone through she might have been by now a hard-bitten, disillusioned young woman; but she was not. She was one of the sunniest and sweetest young women I have ever met. Nothing disturbed her infectious gaity. She bubbled with fun and friendliness. Everybody fell for her, women in particular. She had managed to acquire and cherish some delight in poetry, music, and sketching. She was the adored adopted aunt of about half a dozen children.

Her tuberculosis spread in both lungs, larynx, and trachea. Each x-ray film showed advancing

shadows, until each lung looked like a snowstorm. She had to talk in whispers, and her swallowing of food was painful to watch. It was evident that she was going to die, and that nothing could be done.

A week or so before the end she developed a strong positive transference towards me; so I took to sitting with her at night when her dyspnoea frightened her, until her opiate took effect and she dropped off to sleep.

It was then that I learned her history and her bewildered attitude towards it. Her divorce had never gone through; so she had never been able to marry Bill, the young farmer. But that didn't worry her in the least; to her it was perfectly natural and right that she should make him happy. There was no feeling of guilt. She adored him; and her life with him and the horses, the ducks, and the goats *was* idyllic—but it was somehow unreal. Even had she been legally married to Bill, she would have continued to feel that her first unhappy marriage was the real one. Miserable and exasperated often, insecure always as she had been with the playboy, it was the small memories of midnight feasts—of a stray kitten they adopted on Christmas Eve and played with on the bed—it was memories like these that kept crowding in now. And then she said something startling. Without rancor or self-pity, without question and with complete acceptance, she said, "It looks as if I have a *need* to suffer." She died that night. There was no mistake about the dose of morphia.

I feel that her history is worth giving in some detail, because it has features in common with two other women patients. In all three cases there had been an unhappy but curiously vital first marriage, and a brief glimpse of happiness and security in a second unlegalised alliance, which seemed to them unreal and dreamlike in comparison. In all three the disease was diagnosed early and brought early to treatment without avail. They all lost their good looks and became skull-faced, with bodies and legs bloated with edema. All three had sweet sunny dispositions, which persisted undimmed to the end in spite of their afflictions.

NATURE OF THE DISEASE

MY TENTATIVE conclusions are that patients who develop pulmonary tuberculosis in the absence of any classical physical environmental causes often do so because of disease in their psychological environment—their relation to themselves or to the world outside.

We are all agreed that certain physical distressing circumstances lower a patient's resistance to disease, but that is only an empirical phase to cover everyday experience. We really know nothing yet about the biochemical tissue changes (if any) that are involved when "resistance is lowered." We are only saying really that the soil is being made ready for the seed. The patient's tissues are ready to be diseased. In psychological distress the patient as a whole is ready to be ill—in fact, is ill already. And the ubiquitous bacilli both endogenous and exogenous are there ready to oblige.

This is tantamount to saying that tuberculosis provides means for a flight from frustration, for self-punishment and all those other dark urges which are continually shipwrecking our best behavior. I believe this, with half of me; but my alter or super ego would like to have mathematical confirmation. I cannot be whole-hearted until we can measure in grams per liter the presence or absence of disease-resisting substances in the body fluids.

Even if we cannot accept that thesis fully, I think we must agree to the generalization that every individual reacts to a disease according to his personality; from which it must follow that the psychoneurotic, when given a touch of tuberculosis, will exploit his disease process to suit his pattern of living—or of dying. Moreover, such a patient may develop a secondary reactive personality, of which the disease is a complementary and necessary part, as in the "Dornford Yates syndrome" I described earlier.

Obviously, if such a patient is to recover from his tuberculosis, we must treat more than the local lesions and the toxic manifestations. His concurrent psychological disease must be alleviated, and alleviated in good time, if he is to recover and not become chronic or incurable. Time itself is notoriously a great healer in cases of emotional maladjustment that are not basic. The period of retreat in a sanatorium—that mother figure—brings about changes in both the inner and outer lives of many, probably most patients. They overcome the disease when they are ready. But for quite a few cases it would be as well if psychiatric help and guidance were at hand to expedite their readjustment.

New Drugs

Information published in this department has been supplied by the manufacturers of the products described.

FOLIC ACID

(Squibb Therapeutic Formula-Modified and Squibb Special Formula-Modified)

PURPOSE: Bone marrow stimulant.

COMPOSITION: Each capsule of Therapeutic Formula-Modified contains:

	Units		Mg.
Vitamin A	25,000	Riboflavin	5
Vitamin D	1,000	Niacinamide	150
	Mg.	Ascorbic acid	150
Thiamine HCL	10	Folic acid	5

Each capsule of Special Formula-Modified contains:

	Units		Mg.
Vitamin A	5000	Riboflavin	3
Vitamin D	800	Niacinamide	20
	Mg.	Ascorbic acid	75
Thiamine HCL	3	Folic acid	1

INDICATIONS FOR USE: Therapeutic Formula-Modified for treatment for deficiency states associated with certain macrocytic anemias. Special Formula-Modified for maintenance therapy.

DOSAGE AND METHOD OF ADMINISTRATION: By prescription.

HOW SUPPLIED: Therapeutic Formula-Modified—Bottle of 100, $22; bottle of 1,000, $198. Special Formula-Modified—Bottle of 100, $6.77; bottle of 1,000, $63.30.

PRODUCER: E. R. Squibb & Sons, New York 22, N. Y.

MULSAVITE

PURPOSE: To provide a therapeutic multivitamin preparation permitting prescription of any multiple of five times the minimal daily requirements.

COMPOSITION: Each capsule contains:

	Units		Mg.
Vitamin A	20,000	Pyridoxine Hydrochloride	1
Vitamin D	2,000	Calcium pantothenate	10
	Mg.	Niacinamide	50
Thiamine Hydrochloride	5	Ascorbic acid	150
Riboflavin	10	Mixed tocopherols	10

INDICATIONS FOR USE: Conditions requiring multivitamin therapy.

DOSAGE AND METHOD OF ADMINISTRATION: By prescription of the physician.

HOW SUPPLIED: In bottles of 30 and 500 capsules.

PRODUCER: Sharp & Dohme, Inc., Philadelphia 1, Pa.

ESTROGEN-PROGESTERONE SOLUTION

PURPOSE: Combined estrogen-progesterone therapy.

COMPOSITION: Each cc. of solution contains:

Natural estrogenic substance	20,000 I.U.
Crystalline progesterone	10 mg.

DESCRIPTION: The hormones are carried in sesame oil with chlorobutanol added as a preservative.

INDICATIONS FOR USE: In treatment of secondary amenorrhea (Zondek's technic), of habitual abortion according to Vaux and Rakoff. Menorrhagia and ovarian failure frequently respond to therapy with the combined hormones.

DOSAGE AND METHODS OF ADMINISTRATION: In treatment of amenorrhea, 1 cc. is injected intramuscularly for 2 to 5 days. In treatment of habitual abortion, 1 cc. is injected intramuscularly 2 or 3 times weekly from the fourth to the tenth week of gestation. In menorrhagia, 1 cc. is given for 2 to 5 days. Dosage for ovarian failure should be individualized.

CAUTIONS: This preparation should not be used if needle therapy is contraindicated or if underlying pathology precludes its successful use.

HOW SUPPLIED: In 5 cc. rubber capped multiple dose vials.

PRODUCER: George A. Breon & Co., Kansas City 10, Mo.

SEARLE HYDRYLLIN

PURPOSE: An antihistamine for allergic manifestations.

COMPOSITION: 25 mg. (⅜ grain) of Searle Diphenhydramine and 100 mg. (1½ grains) of Searle Aminophyllin.

DESCRIPTION: This histamine antagonist, Searle Hydryllin, combines two therapeutically effective agents—diphenhydramine and Aminophyllin. Diphenhydramine is the name accepted by the Council on Pharmacy and Chemistry of the American Medical Association for β-dimethylaminoethyl benzohydryl ether. Hydryllin has the advantage over other antihistaminics in that in addition to containing diphenhydramine, it also furnishes the well-known stimulating and spasmolytic effects of Searle Aminophyllin. Searle Aminophyllin is definitely spasmolytic in action and Searle Diphenhydramine is antihistaminic. The diphenhydramine and Searle Aminophyllin, as optimally combined in Hydryllin, were so combined as to curtail, or at least appreciably diminish, the depression (drowsiness and las-

situde) incident to the use of diphenhydramine hydrochloride alone.

INDICATIONS FOR USE: Hydryllin has been found effective in all allergic conditions in which antihistaminics are indicated; for example, urticaria, hay fever, allergic rhinitis, allergic rhinitis with asthma, asthma and atopic and eczematous dermatitis.

DOSAGE: The recommended dosage, preceded by a test dose of one tablet, is one or two tablets three or four times daily. The minimal dose should always be used which will relieve the symptoms.

HOW SUPPLIED: Hydryllin is supplied in bottles of 100 tablets.

PRODUCER: G. D. Searle & Co., Chicago 80, Ill.

CASEIN HYDROLYSATE

PURPOSE: To provide all the essential amino acids, as well as peptides and polypeptides in a preparation of high nutritive value

COMPOSITION:

Essential Amino Acids:

Arginine*	2.9%	Phenylalanine	4.6%
Lysine	6.7%	Valine	5.9%
Tryptophane	1.1%	Methionine	2.7%
Threonine	4.3%	Isoleucine	5.9%
Histidine*	2.7%	Leucine	8.7%

also

Cystine	0.4%	Tyrosine	2.8%
Total Nitrogen	13.5%	Carbohydrate	0.0%
Amino Nitrogen	3.4%	Fat	0.0%
Sodium	2.0%	Calories/gram	3.8
Total Ash	5.4%	Calories/ounce	110.0
Moisture	4.0%		

Purines, including nucleic acid—None.

*Authorities differ as to essentiality in man.

DESCRIPTION: Fine granular solid, light buff in color.

INDICATIONS FOR USE:

Established:

1. To promote wound healing and convalescence by replacing loss of tissue and blood proteins in injury, including severe burns, or in acute or chronic disease.
2. To hasten the establishment of positive nitrogen balance postoperatively by rapid replacement of the nitrogen losses which have been described as toxic destruction of nitrogen.
3. To increase the resistance of surgical patients by establishing normal plasma globulin patterns.
4. To facilitate the management of patients with gastrointestinal disturbances by providing effective protein nutrition.

DOSAGE AND ADMINISTRATION:

Dosage is determined individually for each patient on basis of diagnosis, physical condition and weight. Casein Hydrolysate is intended for oral administration, but because it is completely soluble it may also be administered by tube, either by mouth or rectally. It should *not* be administered parenterally.

CAUTIONS:

For patients who take little or no other food, carbohydrate should be added to the hydrolysate, up to an amount equal in weight to that of the hydrolysate. To maintain the desired caloric and nutritive balance, the proportion of carbohydrate added to the hydrolysate should be progressively reduced as the caloric intake in natural food increases.

HOW SUPPLIED: One-pound bottles.

LIST PRICE: 1 lb. bottle—$4.75.

PRODUCER: E. R. Squibb & Sons, New York, N. Y.

BUNESIA

PURPOSE: Antispasmodic, sedative and antacid.

COMPOSITION: Each tablet contains 2.5 mg. homatropine methylbromide, 20 mg., Butisol sodium (sodium 5-ethyl-5-secondary butyl barbiturate), 300 mg. magnesium hydroxide, and aromatics.

INDICATIONS FOR USE: In treatment of irritable colon, peptic ulcer, gastric neurosis, chronic constipation, cardiospasm, pylorospasm, and aerophagia.

DOSAGE AND METHOD OF ADMINISTRATION: Four to six tablets a day, depending upon individual requirements.

HOW SUPPLIED: Green bisected tablets in bottles of 25, 100 and 500.

PRODUCER: McNeil Laboratories, Inc., Philadelphia 32, Pa.

STREPTOMYCIN

PURPOSE: Antibiotic therapy.

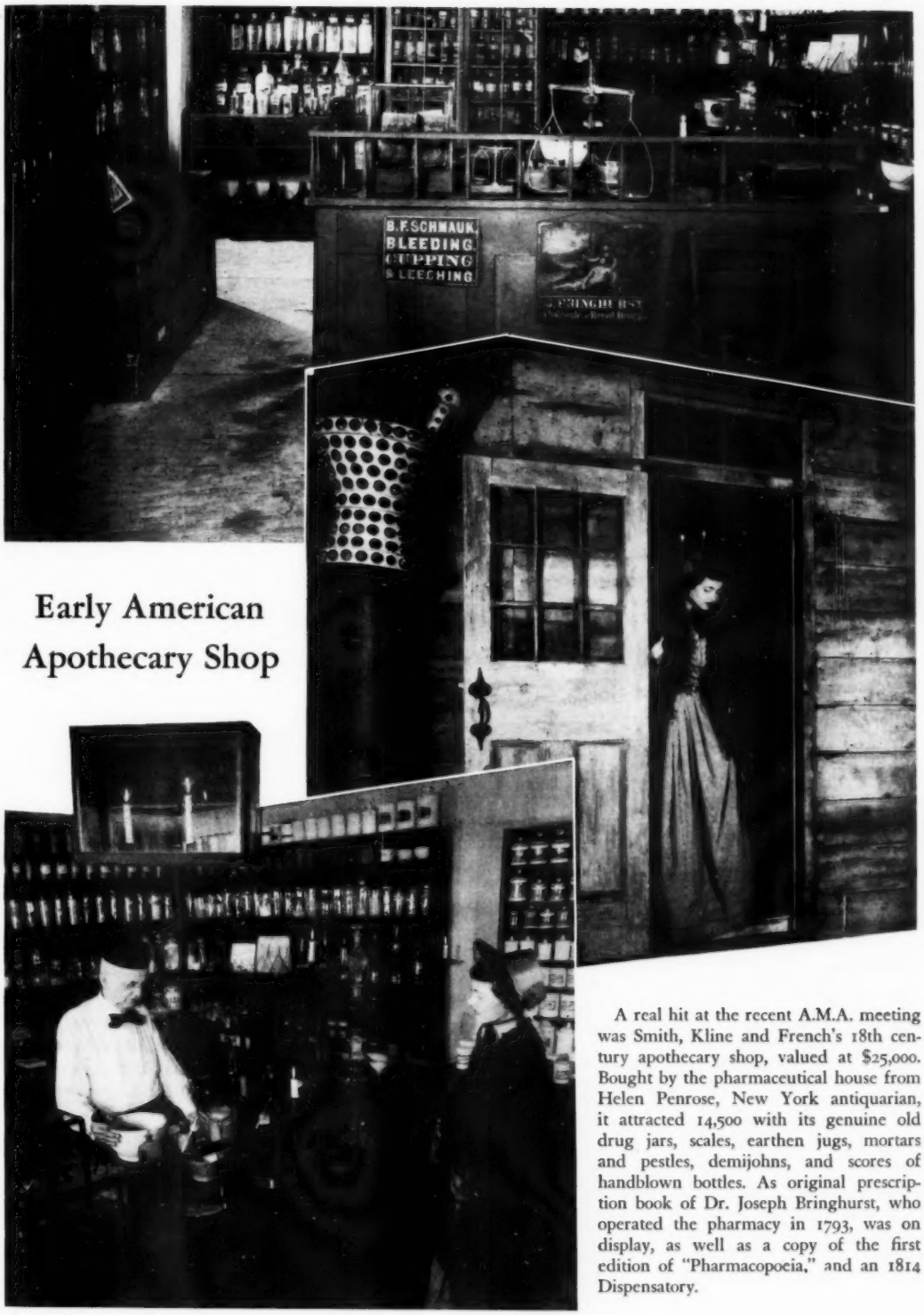
COMPOSITION: Each vial contains: streptomycin (as streptomycin sulfate)—1 g.

INDICATIONS FOR USE: Streptomycin, a basic antibacterial substance obtained from actinomyces griseus culture fluid, is effective in the treatment of tularemia, H. influenzae infections, gram-negative, bacillary, urinary, or systemic infections with or without bacteremia caused by E. coli, Ps. aeruginosa, K. pneumoniae, A. aerogenes, and Salmonella group of organisms.

DOSAGE: Intrasmuscular or subcutaneous injections of 1 to 3 g. daily. Intrathecal injections of 50 mg. daily may supplement intramuscular injections in H. influenza meningitis.

HOW SUPPLIED: In 1 g. vials.

PRODUCER: The Upjohn Company, Kalamazoo 99, Mich.



Early American Apothecary Shop

A real hit at the recent A.M.A. meeting was Smith, Kline and French's 18th century apothecary shop, valued at $25,000. Bought by the pharmaceutical house from Helen Penrose, New York antiquarian, it attracted 14,500 with its genuine old drug jars, scales, earthen jugs, mortars and pestles, demijohns, and scores of handblown bottles. As original prescription book of Dr. Joseph Bringhurst, who operated the pharmacy in 1793, was on display, as well as a copy of the first edition of "Pharmacopoeia," and an 1814 Dispensatory.

After Hours

BIG-GAME HUNTER

Big-game hunting is an activity usually identified with professional adventurers, wealthy sportsmen, and wild tribesmen. That it need not be limited to these people, however, is attested to by the experiences—and trophies—of Dr. Charles E. Boys, surgeon, of Kalamazoo, Michigan.

From the time Dr. Boys started his practice in 1904 until 1925, the only vacations he took were from two to four weeks each year when he would sit in the amphitheatres of various clinics to observe clinical surgery. But in 1925, when he was 45 years old, he joined a deer-hunting party in upper Michigan for his first "real" vacation.

Similar excursions in successive years developed a yearning for more distant hunting grounds and bigger game. Elk hunting in Wyoming and Montana followed, and the doctor managed to bring back some good trophies.

His next objective was Ontario, Canada, both east and west of Lake Superior, with moose as the game sought. Some moose were seen, but the "take" was so limited that the next move was to Alberta, Canada, where trips were made two different years. Moose and deer hunting were better, but there was also added the opportunity to attain that goal of all big-game hunters—mountain sheep and goats.

Then came an interesting hunting trip to Chihuahua, Mexico. Entering the country from El Paso, Texas, the doctor's party drove south about 200 miles to camp in the Sierra Madre Mountains. From one camp they obtained deer, antelope, quail, and wild turkeys. Bobcat, bear, wild boar and mountain lion also were to be found but no specimens of this latter group were taken.

CHARLES E. BOYS, M.D.

On another occasion Dr. Boys motored from Nogales, Arizona to Matzatlan, Mexico, in quest of jaguar, but the weather was so dry that even the trained lion hounds could not follow the scent after mid-forenoon. The hunt was abandoned and the hunters substituted attendance at a bull fight at Matzatlan, and a sword fishing venture at Guaymas.

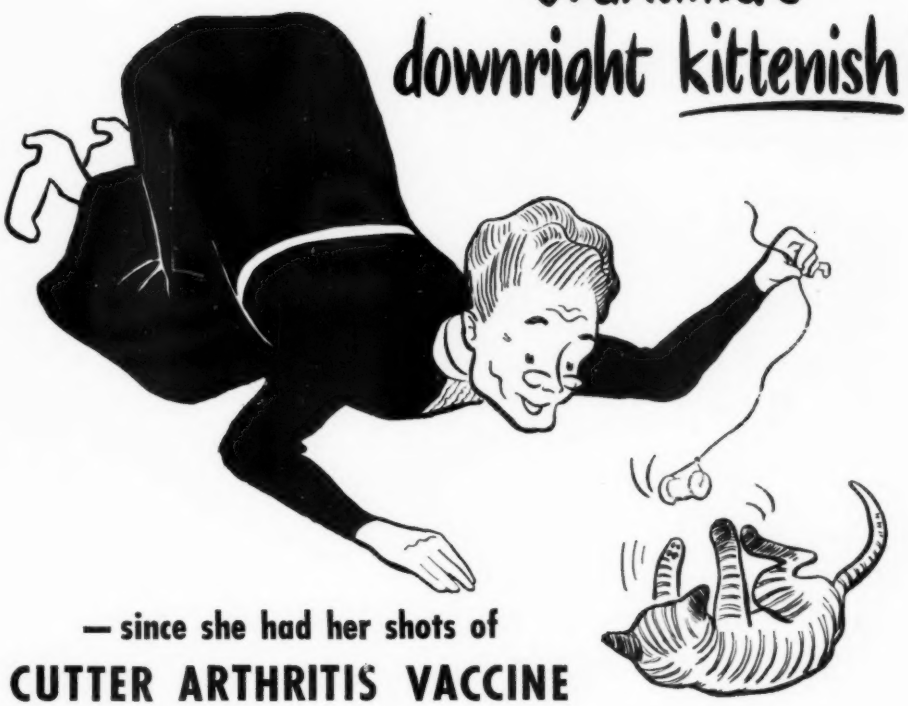
Dr. Boys' next trip was to the interior of Alaska, 20 miles up the Healy River from the little town of Healy. Camp supplies were transported from Healy by a wagon team, guided by a drunken driver, for fifteen miles with the river bed as the only road. From that point supplies were packed five more miles to the campsite. Sheep were plentiful there and each hunter obtained his limit of two good heads.

The following year the doctor hunted near Skilak Lake in the Kenai Peninsula. To get there one took a boat from Seattle to Seward, Alaska; the railroad from Seward to Anchorage, and a plane from Anchorage to Tustamina Lake, about a hundred miles south; then walked 10 miles to camp.

This was and is the most famous moose country in the world. Many animals were seen before the guide would permit any of the party to shoot one. He was jealous about the kind of trophies they might bring in. From this area, Dr. Boys obtained a large bull, a cow, and a three-months-old calf, which now adorn a cubicle in the Kalamazoo Museum as whole mounts. From a near-by mountain sheep area, Indian River Canyon, specimens of a large ram, ewe, and lamb were obtained and these also have their permanent residence as mounts in the Kalamazoo museum.

The two trips to the interior of Alaska were followed by two others with interval of a year or so, to Kodiak Island, in quest of Kodiak bear. A coastal boat provided transportation from Seward to Larsen Bay cannery, whence the hunters were taken by plane to Lake Kenai, about thirty miles in-

Grandma's downright kittenish!



— since she had her shots of CUTTER ARTHRITIS VACCINE

Really, it's surprising—the number of arthritic patients who "feel better than they have in years," after treatment with Cutter Arthritis Vaccine (Sherwood's Formula).

Crowe* records that such comments as "can now kneel"..."can now go up and down stairs"..."can now walk without a stick"... are frequent among his patients. And, of course, there's the prize one where "ten years of continuous pain disappeared after the seventh injection."

We can't say, exactly, how this vaccine alleviates arthritic pain. Or why it slows down the progress of the disease. But the fact remains — *it does!*

**Crowe, H. Warren, Handbook of the Vaccine Treatment of Chronic Rheumatic Diseases, Oxford University Press, 2nd edition, 1932, covering treatment with similar vaccines.*

Sherwood's Formula contains polyvalent strains of:

Streptococci	30%	with 1,000,000 organisms per cc.
Staphylococci	30%	
Pneumococci	10%	
M. catarrhalis	10%	
B. friedlanderiae	10%	
B. influenzae	10%	

Cutter Arthritis Vaccine won't help all patients and many who are helped may have relapses — but it's a safe way to start, backed by a sound theory, and it carries with it none of the hazards of gold. Surely, you'll want to see what its results will be in your practice.

CUTTER

Fine Biologicals and Pharmaceutical Specialties

CUTTER LABORATORIES • BERKELEY 1, CALIFORNIA

land, where they made camp on a small stony island a mile from the shore of Lake Kenai. Bear were found on the shores around the lake because the mountain streams emptying into Kenai Lake were teeming with salmon, a principal bear food.

While at Kodiak Island, Dr. Boys obtained a trunkful of bird skins for the museum at the University of Michigan. Dr. Max Peet had given instructions in bird skinning which in some cases is as delicate as working on brain tissue. A number of rather rare specimens were obtained such as cormorants, bald eagles, sea crows, sea parrots, harlequin ducks, and others of smaller kind, as well as a variety of Alaskan gulls.

Dr. Boys and his guide, Sasha Siemel, with African Jaguar.

Dr. Boys' last major hunting trip was to the Matto Grasso, Brazil, in quest of jaguar. The guide was Sasha Siemel, famed for despatching jaguar with only a spear. The journey was by boat to Rio de Janeiro, then train to Sao Paulo, and then about 1800 miles west by another railroad train. At the end of the rail trip they went by truck twenty miles to a ranch called "Miranda." From the ranch the party went on horseback 40 miles back into the watersoaked jungle. The baggage was carried in oxcarts with wheels 10 feet in diameter, and drawn by six or eight oxen. It required three such teams for the baggage, and the 40 miles from ranch to jungle camp required three or four days. Water stood even in the trail from a few inches to four or five feet deep. High wheels kept baggage from getting wet—usually.

Dr. Boys and his companion got five tigers (jaguar), and several wild boar, marsh deer, two monkeys, and also two crates full of tropical bird skins for the University of Michigan museum.

"Hunting in the tropical jungles," says Dr. Boys, "stands out in marked contrast to that of the cold climates. In the north country the best of water is found everywhere. In the jungle it was always warm slough water full of mosquito larvae, grass, roots, leaves, scum and residue from alligators. These had to be filtered off by drinking through a strainer called a "maté" tube.

"In the north there are no mosquitoes, snakes, or other pests in the big game season and one can always find firewood to warm the tent. In the jungle the problem was to keep mosquitoes, bugs, ticks, vampire bats, poison toads, snakes, and army ants from disturbing one's peace of mind. Cheese cloth must be used instead of mosquito netting, and the finer mesh makes your covered cot seem like a fireless cooker, and the bats have a habit of puncturing a toe, knee, or elbow which may happen to press against the canopy. If one gets up in the night he must flash-light the ground and his shoes to be sure some snake, centipede, or poison toad will not be encountered.

"In all hunting trips we enjoyed experience, but avoided adventure. Meeting local inhabitants from Alaska to the Brazilian jungles has been recreative, interesting, and educational. When one gets back to the U.S.A. the contrast is at once impressive."